

Bob Cooper's

AUGUST 15 1996

# SatFACTS

MONTHLY



Reporting on "The World" of satellite television in the Pacific Ocean Region

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GLOBAL  
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**Vol. 2 ♦ No. 24**

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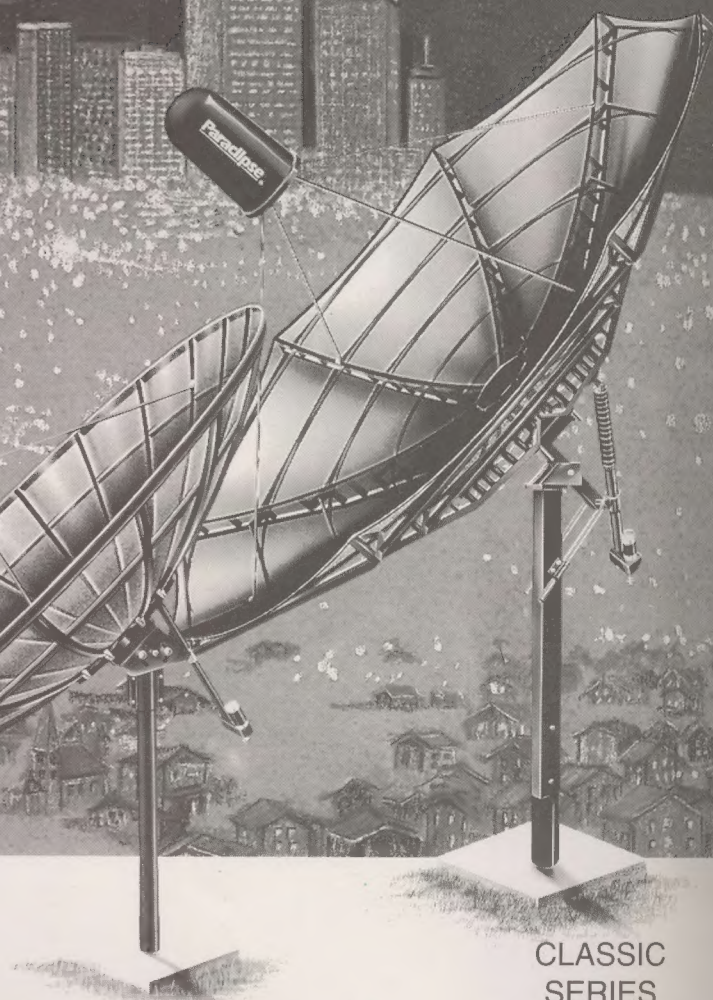
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# SatFACTS

## MONTHLY

SatFACTS Monthly is published 12 times each year (on or about 15th of each month) by Far North Cablevision, Ltd. This publication is dedicated to the premise that as we enter the 21st century, ancient 20th century notions concerning borders and boundaries no longer define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of the messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

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## COOP'S COMMENT

Response to my July 'Comment' has been significant and I will share a tiny fraction with you. **Brian Watson**, co-owner of a commercial satellite system installation firm in Tasmania, offers:

*"I remember the spontaneous applause for Deutsche Welle during last January's Space Pacific show when the German broadcaster announced their free to air, MPEG-2 DVB Compliant policy. Now we are seven months down the track and what real progress has been made? We receive 3 to 4 phone calls a day from people who are ready to purchase a DTH system but we cannot in good faith sell them a system that requires a special receiver for every service they might wish to have in their homes."*

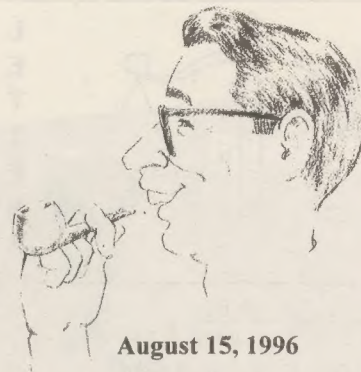
**Mac Shimamoto**, a satellite system distributor from Osaka, Japan, is concerned that MPEG-2, rather than being a universal system is likely to turn into precisely the opposite; a system which allows each country to close its doors to viewers from outside their national territory.

**Jeff Cohen**, Director of Development for World Radio Network with headquarters in London, notes, *"Here are some reasons why MPEG is the way it is.* First is receiver cost; networks want the flexibility to tailor pricing to the country. That may mean giving away receivers (or close to it) and later charging highly for the subscription cards. STAR TV told us they will not let their subsidised receivers sold in markets such as India have the capability of picking up TV channels (even radio services) except those from the Star bouquet for India. Why? Because they fear the India receivers will end up being exported and resold to other parts of the world. The European Bouquet (EB) went to Star with the concept of 'clear channels' and Star politely told us to 'go away'. When EB began we naively thought that, as with analogue transmission, there would be both clear and encrypted channels, but all receivers would get the clear channels as a minimum. Now we know that will not happen.

*"Furthermore, the idea of receiving TV across a whole continent is not working in Europe. Just one tiny example: The 1996 Academy Awards gave lawyers enough work to last them until the 1997 ceremony! If a programme is sold exclusively to a station, that station does not want the audience to be able to see it on another station. But that is what is happening now in Europe and it all blew up at the Oscars in a dispute between a Dutch channel and the BBC. The same thing happens with sport and movies. So it suits everyone to segment TV clearly into distinct markets.*

*"In Europe the era of seeing others TV is rapidly closing. The expatriates who want to keep in touch with home will be the losers unless the bouquets contain their channel. And there are selfish forces around. Take Japan where big operators are planning direct to home services and do not seem to want too much compatibility."*

So is it fair to limit blame for the MPEG-2 mess to Scientific-Atlanta, PACE and the receiver manufacturers? Not at all; the national broadcasters are equally guilty of the "every man for himself" syndrome. Solution? First we shoot the engineers ...



August 15, 1996

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### -ON THE COVER-

Olympic viewer. Stu McLeod, cable TV technician at Doubtless Bay Cablevision (NZ) was set up to follow the Olympic coverage with the Promax MC944 system analyser as he adjusted cable line amplifiers on his 62 channel system.



**Power-Vu for HACBSS?**

"I refer to page 4 SatFACTS 15 July reporting the Australian B-MAC/HACBSS services are to be replaced with PowerVu. The particular digital compression system used for satellite broadcasting in Australia is effectively determined by the A and B satellite licenses. These licensees, which are currently trading under the name of Galaxy, have developed a 'standard' which has been approved by the Australian government. Unless other broadcasters wish their audiences to purchase different set top units to those required to receive satellite pay TV, there is simply no alternative to using the standard set by the A and B licensees and approved by the Federal government.

"SBS is a member of the Remote Area Broadcasting Services (RABS) group which is investigating conversion of the present free to air satellite B-MAC based services to digital. No decisions have been made yet regarding either the digital technology to be used or the service provider. The group strongly favours a DVB compliant solution but is very aware of the range of interoperability issues to do with particular suppliers of this technology."

David Soothill, Director  
Communications and Planning, SBS

"The announcement by S-A they will supply their Power-Vu system to ABC (Australia) for their networking is sending waves of uncertainty through the HACBSS outback industry.

Consumers have heard there will be a standards change to digital and are no longer interested in purchasing the B-MAC equipment. I have requested that officials make a clear statement of intent about digital as rapidly as possible to settle the rumours that are now sweeping rural Australia. At the very least consumers should be assured there will continue to be a

-continued page 4-

**PROGRAMMER  
PROGRAMMING  
PROMOTION****UPDATE****AUGUST 15, 1996**

**HBO Asia** plans to add a second channel, Cinemax, by end of this year. Cinemax in its USA form is older, more classic movies with emphasis on action and adventure, typically 5 to 15 years in age. The format for Asia is not announced. HBO is also trying to create distribution into China, using one of the CCTV network channels now on satellite, for a part of each day.

**Discovery Channel** ran into problems in conversion from PAL B-Mac to SA PowerVu MPEG late in July; SA was unable to ship receivers as scheduled, latest conversion date now August 15+. And, Discovery Asia, Inc. has moved offices from Hong Kong to 20 Loyang Crescent, Singapore 508984 (telephone 65-548-0588; fax 65-548-0598).

**New Zealand Sky Network** terrestrially distributed 4-1/2 channel encrypted pay television service plans April 1 start date, possibly via PAS-2, Ku beam that covers New Zealand (44/45 dBw) and Australia (40/46 dBw). Service will be MPEG-2, format supplier not chosen, intended initially to replace terrestrial fibre optic and microwave linking of Auckland studios to transmitters scattered over North and South Islands and cable TV headends. No announced DTH plans; stay tuned.

**RPN-9 Manila, 142.5E (1375IF)** has not only corrected early technical problems (SF#23, p.28) but turns out to be high quality 75%+ English language station. RPN-9 is using satellite to link to several new terrestrial TV stations throughout Philippines but is unlikely to be on present bird beyond December (contract for initial use expires October 2). Signal level typically 1 to 3dB hotter than EM TV on same bird, programming is heavily from USA and proving very popular with home DTH viewers. Time offset is biggest negative; evening USA network and movie programmes start at midnight in NZ, 10PM eastern Australia. Viewers, start your VCRs!

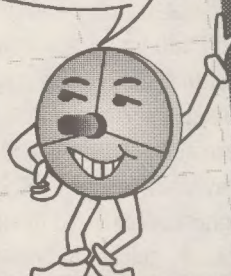
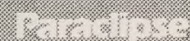
**Olympic coverage of EM TV (via Australia 7 Network), Guangdong CCTV (As2, 1310IF, Hz) and TPI (C2, 1070IF, Hz)** offered multitude of coverage hours, often all taking different events at same point in time giving viewers unparalleled access to sporting venues. One NZ cable firm offered viewers these three plus local TV1 terrestrial coverage; 4 different events to select from! Also running during Olympics: Australia 7 Net feeds on PAS-2 Ku, 12,420Hz - the first serious use of this satellite's Australia-New Zealand Ku footprint.

**Intelsat 703**, now permanently at 57E, has inherited two Rimsat 130E Indian programmers (effective 1 August) leaving 130E lightly loaded. Money TV and Sun TV have moved joining NEPC India as well as others; details p. 30.

**Perfect TV!** (Japan's Ku DTH service on JCSAT-3) is not perfect. In fact contrary to many reports, it is not yet running commercially. More than a dozen Japanese firms are set to offer Ku DTH hardware for the service, only Sony has "demonstration" receivers in Japanese stores and they basically don't work. Reason why: "Software glitches" in the receiver addressing network, possibly at the uplink. Grand kick-off now delayed from August to October (extended report in Coop's Technology Digest, August 23).

**STAR TV** is testing on Palapa C2 on transponder 3E (1650IF) and will be using 3EH(z) and 5EH(z)[1570IF] for MPEG delivery of Indonesian entertainment package as early as October. The 3E/5E Indonesian packages will migrate to S-band and Indostar after this new bird launches in 1997. One proposal being floated by STAR - making selected programming from proposed C2 package available beyond Indonesia, including sports, movies, "V", "Plus." Flaw in plan - poor southern coverage of extended (below 3,700 MHz) beam means it won't help much "down here."

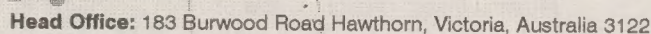




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**STARNET**



-Letters / continued from page 2-  
B-MAC HACBSS service for some number of years after the digital start-up to allow consumers to continue reception without having their present equipment obsoleted overnight.

Les Brooks, Alice Springs, NT

S-A would like nothing better than to slide in the side door to undermine the "standard" created by Galaxy. Alas, HACBSS users are widely scattered and essentially unorganised to voice their objections to the S-A plan. The initial PowerVu system for ABC consists of 9 sites equipped with 19 encoders and 48 digital PowerVu receivers. Of interest, ABC is installing the S-A System 2000 UNIX-based network management and subscriber control system to manage the system. If ABC only intends to use PowerVu for digital interchanges, why does it need a "subscriber control" system? Do we hear protests out there?

TNT: Is It or Is It Not?

"We have not yet decided to sell DTH subscriptions (via PAS-2) as we do not want to license TNT/Cartoon Network on a DTH basis. We are not set up to provide this service and there is much involved for this to be worthwhile to us. I understand a company in New Zealand is advertising using our TNT logo suggesting the service is available. They do not have our authority to do this."

Yvette Jollye, Turner International

Turner has numerous reasons to not offer TNT/Cartoon via PAS-2 at the DTH level. A major one is the US\$1,050 cost (wholesale) for the 9708 decoder plus freight and duty and the probability the service will transfer to digital long before anyone purchasing such an IRD has had a reasonable time to justify the initial cost. They do, however, offer TNT/Cartoons for SMATV (motel/hotel) use but there are minimum annual charges (negotiable) that smaller SMATV systems might find extreme.

CDE-2000 Sources

Where can I buy a CDE-2000 for use in New Zealand?

W.J.R., Auckland

Not in New Zealand as the services covered by the CDE-2000 are not legally available to Kiwis. Elsewhere, try Australian sources.

## HARDWARE EQUIPMENT PARTS

## UPDATE

AUGUST 15, 1996

**IndoStar**, the "S" band MPEG-2 format DTH service planned for launch to 106.3E late this year (SF#21, p. 7), will use Thomson/Hughes USA bred DTH receivers. Thomson is constructing a plant within Indonesia to build the receive system packages, plans 100,000 initially.

**S-A D9233 Consumer MPEG IRD.** The manufacturer says they will not build them on their production line until some firm steps forward to purchase 100,000 units. The unit had originally been quoted at a factory cost of US\$600 each (price to bulk buying distributor) whereas commercial D9223 sells for US\$1,250 individually. Differential in ultimate user price is likely to be much smaller than US\$650 difference suggested because D9233 is quoted at 100,000 lot pricing while D9223 is at end user pricing. A CMT executive went to Toronto in July to inspect S-A facility, was told S-A had just completed an initial production run of 7,000 consumer units and actually saw one in operation (this may have actually been the Middle East D9232 unit; see p. 31, here). SA plans "business television" version of 9223, then SMATV version allowing access to two or more programme feeds out of single receiver before end of fourth quarter. The 9233 DTH unit, subject to finding a buyer for 100,000 units, is scheduled after these two additional models are into production. Don't hold your breath.

**Galaxy DGT-400** decoders which have functioned since 3 June for European Bouquet (see SF#22, p.18) as well as MPEG-2 service that is temporarily free to air on PAS-2 are at risk. During latter portion of July Galaxy conducted middle-of-the night over-the-air "decoder enhancement" preparing for new Night Moves (11PM-4AM Sydney) adult R-rated service. All programming is now censorship rated and any DGT-400 that has been "enhanced" must see a companion programme rating to function. NBC and European Bouquet do not have censorship ratings built into their SI stream and some DGT-400 users who previously could watch the Bouquet or NBC report their decoder has stopped functioning there; see p. 28 here. Galaxy does "enhancement" typically 3AM-5AM and the way to avoid having your C-band useful DGT-400 "hit" is to not leave it on Galaxy during the wee hours of the morning. DGT-400s are turning up in 'Swap and Trade' newspapers in Australia, usually an indication that "grey market" is evolving.

**NLT 3000** receivers are now routinely stocked by at least one Australian firm: Skandia Electronics Pty Ltd. (tel. 61-3-9819-2466). There are two versions, one for the Galaxy format, another for the European Bouquet.

**Indonesian B2P**, slightly inclined, is moving to 144E to serve as temporary bird for Philippines Mabuhay which will launch new satellite to same location early 1997.

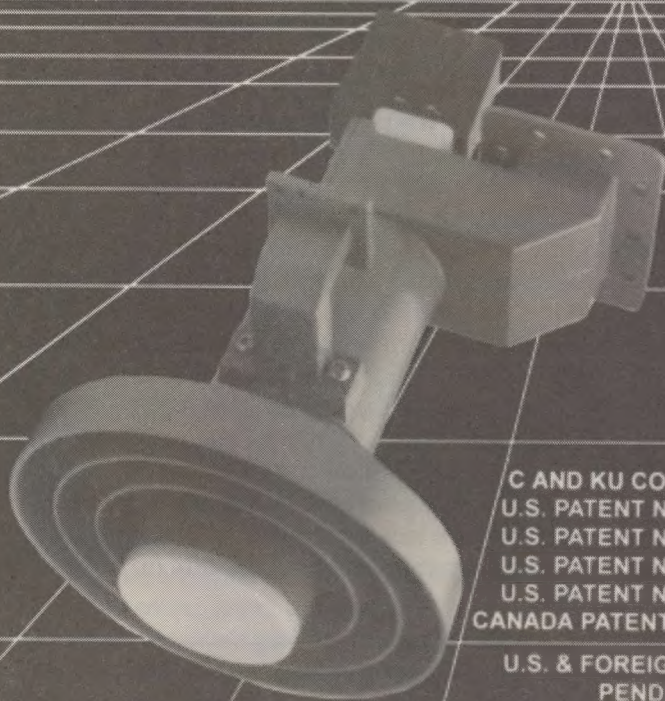
**Intelsat 801** launch delayed to January, 802 until April, 803 until June. This means aged 511 at 180E will continue to plod along an additional 3-6 months before being replaced. How delay in 800 series launches will effect UIH 10 channel English language package (SF#20, p. 22) is to be revealed August 19 when UIH's Doug Stewart visits NZ.

**Musical birds:** Thaicom 1, now at 78.5E, will move to 120E after Thaicom 3 is launched (late this year). No. 3 will go to 78.5E where Thaicom 2 is co-sited. European press reports ApStar 1-A, launched in June without definite orbital location, is now at 134E. Asian sources claim it is or will turn-on at 76.5E. ApStar says 2-R it will go to 122E but full page adverts from AsiaSat claims As3 will go to that location with 24-C, 16-Ku in 1997.

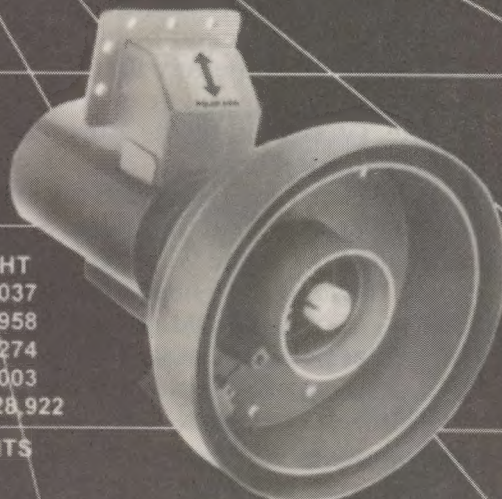


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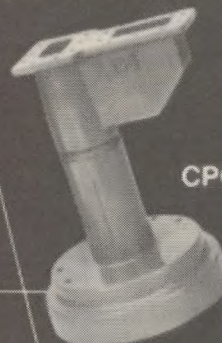
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# RUSSIA'S GLOBAL SATELLITE SYSTEM: GORIZONT, EXPRESS & INTERSPUTNIK VIII

by Mark Long in Thailand

**B**ack in the early 1980s, would-be satellite TV enthusiasts living outside of North America found slim pickings in the skies overhead. In Europe, Africa and the Middle East, for example, the low-power INTELSAT and Symphonie (France) satellites of that era carried only a few TV services. To get a viewable picture, one had to use a very big dish—4.5 meters in diameter or greater—as well as undertake periodic hand cranking of the antenna's acutator arm to keep those wobbling inclined orbit birds within the antenna's main beam. In the era just prior to the launch of the very first EUTELSAT Ku-band satellite, about the only reasonably strong C-band satellite TV signals in the European sky came from Russian satellites.

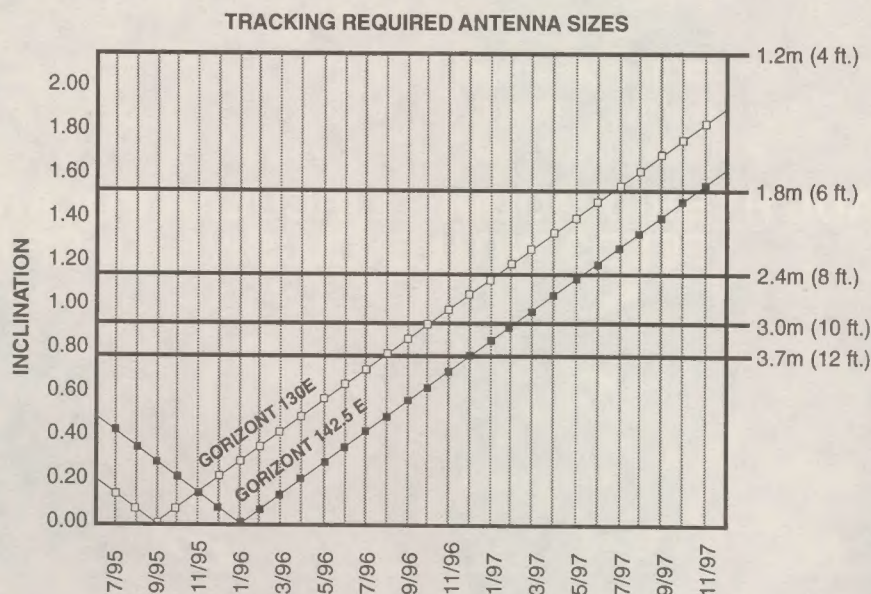
In 1982, a British entrepreneur hired me to bring over a satellite TV system from the United States to a communication show at the Wembley Exhibition hall in London, England. So I hopped on a British Air flight with a 3.7 meter ADM dish, a commercially-made circular polarization feedhorn, a 120 K Cal Amp LNB, and my own home-brewed receiver tuned to Russian satellite specs.

At Wembley, numerous members of both the public and the press stood around our stand, mesmerized by England's first large scale public showing of home satellite TV technology. But once their curiosity had been satisfied, the unanimous verdict of the audience was that no one would pay good money to pick up TV programs from Russian satellites.

Three years later, I found myself standing in the middle of the antenna farm at the Dubna up-link facility a mere 100km north of Moscow. As a gesture of good will just prior to Ted Turner's 1985 Goodwill Games in Moscow, the Soviet Union had granted my request to research some stories about Russian satellite TV for U.S. magazines and the newspapers of the Los Angeles Times Syndicate. My exhilaration at fi-

nally being at the source was inextricably entwined with bizarre experiences of being shadowed by Soviet agents who wanted to know just what I was *really* up to. I just want to watch satellite TV, Boris. Honest!

In the years between then and now, I've watched Russian satellites from a variety of obscure locations, from central Bolivia and the Rio Negro of Argentina, to the wilds of Papua New Guinea and northern Thailand. Following the fall of the Iron Curtain, the Russian satellite system rapidly opened up to customers from abroad. In the Asia/Pacific region alone, more than a dozen satellite TV channels owe their very existence to the Russian satellite system. What's more, it has never ceased to amaze me that satellites originally designed in the late 1970s would still be with us today, providing efficient, reliable service on a global basis. Best of all, the evolutionary changes in the Russian satellite system that are now in motion promise to further expand TV programming availability on a worldwide basis.



**Above:** Gorizont satellites such as the pair at 130° and 142.5° east longitude are launched into N/S inclined orbits in which the values increase at approximately 0.85 degrees per year. The above chart has horizontal lines. On the dates when the satellite's orbit rises above each antenna size line, operators will need to begin tracking each satellite for continuous TV reception. (Data courtesy of Tim Brewer.)



**Table 1. Russian Geosynchronous Communication Satellites**

Russian Designation	Orbital Location	Satellite Class/Flt #	Used by Intersputnik
	16° West	SDRN/Loutch	
Statsionar-4	14° West	Express-2	✓
Statsionar-11	11° West	Gorizont-26	
Statsionar-27	12° East	Raduga-22	
Statsionar-2	35° East	Raduga-28	
Statsionar-12	40° East	Gorizont-31	✓
Statsionar-9	45° East	Raduga -23	
Statsionar-24	49° East	Raduga 1-3	
Statsionar-5	53° East	Gorizont-27	
Statsionar-20	70° East	Raduga-32	✓
	71° East	Gals-1 & Gals-2	✓
Statsionar-13	80° East	Gorizont-24	✓
Statsionar-3	85° East	Raduga-30	✓
Statsionar-6	90° East	Gorizont-28	
	95° East	SDRN/Loutch	
Statsionar-14	96° East	Gorizont-19	✓
Statsionar-T	99° East	Ekran-20	
Statsionar-21	103° East	Gorizont-25	
Statsionar-41	130° East	Gorizont-41 (29)	✓
Statsionar-7	140° East	Gorizont-18	
Statsionar-42	142.5° East	Gorizont-42 (30)	✓
Statsionar-16	145° East	Gorizont-21	

### Russian Satcom Terminology

A certain amount of confusion reigns over the terminology often used to describe Russian satellites as well as Russia's global satellite system. The term **STATSIONAR** (Russian for "stationary") refers to the orbital assignment for each satellite, regardless of the actual class of satellite in operation at any orbital location. The above table identifies the major **STATSIONAR** orbital designations along with their equivalent position in degrees of east or west longitude. **Gorizont**, **Express**, **Raduga**, **Gals** and **SDRN** are the names of actual different classes of Russian communication spacecraft now in geosynchronous orbit about the earth's equator.

The term **Loutch** sometimes is encountered in the literature concerning Russian satellites. **Loutch** is the name of a Ku-band satellite system for which Russia had filed with the International Telecommunication Union (ITU) many years ago. In actuality, however, there are no dedicated **Loutch** satellites currently in orbit. The **Loutch** Ku-band communications payload, however, is carried aboard **Gorizont** and **SDRN** class satellites.

### The Gorizont Satellites

For the past fifteen years, **Gorizont** (Russian for "horizon") satellites have served as the reliable workhorse of the Russian satellite fleet. Today eleven **Gorizont** satellites provide a wide array of telecommunications services from numerous orbital assign-

ments around the globe.

These three-axis stabilized spacecraft feature a solar wing span of 9.46 meters which generates about 1,280 watts of power. **Gorizont** satellites, which weigh approximately 2,200kg, have a warranty life of 3 years and an estimated mission life of 3 to 5 years.

**Gorizont** satellites are not true geostationary spacecraft. Each spacecraft has an initial *negative* inclination of approximately -1.5 degrees (sometimes referred to as a reverse inclined orbit), which changes to a *positive* inclination at a rate of approximately 0.85° per year. The use of negative inclination at the time of satellite deployment provides a period of almost two years in which **TVRO** antennas of 3 meters or less in diameter will not need to track the movements of the satellite as it meanders along the figure-eight track of its inclined orbit.

Longtime satellite observers have previously noted that **Gorizont** spacecraft have lacked a full-time telemetry beacon, a common feature of most other commercial communication satellites. Normal **Gorizont** satellite operation is autonomous, i.e., each spacecraft operates automatically within predetermined parameters. Telemetry data is recorded aboard the satellite and routinely transmitted to Earth once or twice each month. If events occur which force the spacecraft to operate out of its normal operating limits, however, the spacecraft will immediately signal engineers down on the ground.

### Gorizont Channel Characteristics

Each **Gorizont** spacecraft carries one Ku-band (11.525 GHz center frequency) and five C-band (3.705~3.945 GHz) transponders, each with a bandwidth of 38 MHz. The Ku-band transponder is powered by 20 watt amplifier, while the above mentioned C-band transponders are equipped with 15 watt amplifiers. Also available: one high-powered, 75-watt C-band (3.675 GHz center frequency) transponder with a bandwidth of 40 MHz.

**Gorizont** satellites provide a total of four different C-band coverage beams (17x17° global, 9x18° northern hemispheric, 6x12° zone and 5x5° spot) and one 5x5° Ku-band spot beam. Selected C-band transponders can be switched between one of two available coverage beams by ground command (see Table 2). Beam pointing for all coverage areas is fixed prior



Table 2. Gorizont & Express Transponder (Transmit) Characteristics.

Tr. No.	Transmit Frequency	Gorizont Beam(s)/ EIRPmax (in dBW)	Express Beam(s)/ EIRPmax (in dBW)
6	3675 MHz	Global Spot 36.7 49.3	Global Spot 36.7 49.3
7	3725 MHz	Global Zone 29.4 37.8	Quasi-G Zone 31.6 38.5
8	3775 MHz	Hemi 32.7	Quasi-Global Zone 31.7 38.6
9	3825 MHz	Global Zone 29.6 38.0	Quasi-Global Zone 31.8 38.7
10	3875 MHz	Hemi 32.9	Quasi-Global Zone 31.9 38.8
11	3925 MHz	Global Zone 29.8 38.2	Quasi-Global Zone 32.0 38.9
14	3975 MHz	—	Spot Zone 42.3 39.0
15	4025 MHz	—	Quasi-Global Zone 32.2 39.1
16	4075 MHz	—	Spot Zone 42.4 39.2
17	4125 MHz	—	Quasi-Global Zone 32.4 39.3
12	11525 MHz	Spot 42.7	Spot 42.9
20	11625 MHz	—	Spot 42.9

to the launch of each individual spacecraft and cannot be changed once the satellite is in orbit.

Gorizont satellites downlink using right-hand circular polarization (except for the spacecraft at 130° and 142.5° East, which downlink using left-hand circular polarization) in the C-band frequency range and horizontal polarization to downlink within the Ku-band frequency spectrum.

### The Express Satellites

On October 13, 1994, the first of a new generation of Russian Express satellites was launched to 14° West over the Atlantic Ocean. The next Express satellite is scheduled to be launched in the near future to an orbital assignment of 80° East. Express C-band transponders will provide wide beam coverage within an area ranging from central Europe

and the Middle East to Japan and Australia, while two Ku-band spot beam transponders are expected to serve customers in India. Russia also has registered numerous additional STATIONAR orbital positions with the ITU for the future assignment of Express spacecraft.

Based on the reliable Gorizont satellite platform, Express satellites are three-axis stabilized spacecraft which feature an expanded solar wing span of 21 meters which generates about 2,400 watts of power. Express satellites, which weigh approximately 2,500kg, also have an increased warranty life of 5 years and an estimated mission life of 5 to 7 years.

### Express Channel Characteristics

Express satellites feature a highly sophisticated propulsion system which combines hydrazine and xenon plasma thrusters to achieve true geostationary operations. With the launch of Express, the orbital name STATIONAR truly applies!

Each Express spacecraft carries two Ku-band (11.525 and 11.625 GHz center frequencies) and nine C-band (3.705~4.145 GHz) transponders with a bandwidth of 38 MHz. The two Ku-band transponders are powered by 20 watt amplifiers, while the C-band transponders have 15 watt amplifiers.

Also available: one high-powered, 75-watt C-band (3.675 GHz center frequency) transponder with a bandwidth of 40 MHz.

Express satellites provide a total of four different C-band coverage beams (19x19° global, 15x15° quasi-global, 5x10° zone and 5x5° spot) and one Ku-band spot beam. Selected C-band transponders can be switched between one of two available coverage beams by ground command (see Table 2). Beam pointing for the C-band zone as well as the C and Ku-band spot beams can be individually steered by ground command.

Express satellites use circular polarization in the C-band frequency range and linear polarization within the Ku-band frequency range. Express satellites transmit to Earth in the C-band using right-hand circular polarization. Horizontal polarization



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is used to downlink signals in the Ku-band.

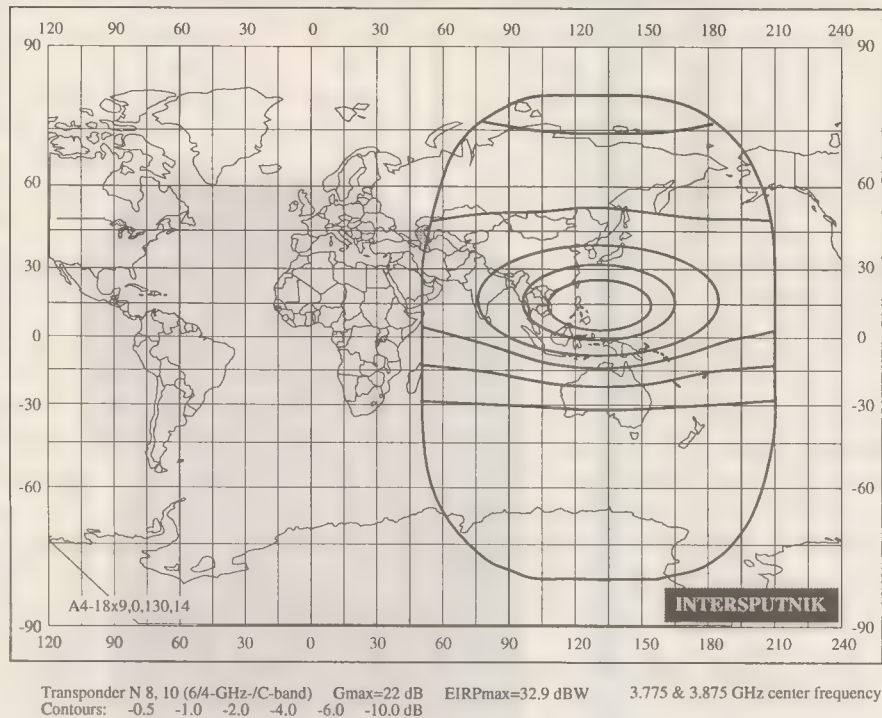
#### **Raduga, Gals, Ekran & SDRN**

Raduga satellites are C-band only spacecraft which operate within an expanded 3.45 to 3.95 GHz frequency spectrum. Raduga class satellites do not carry the high-power C-band spot beam capabilities of the Gorizont and Express satellite classes and therefore are primarily used for the transmission of voice and other narrow band traffic. Raduga satellites are in operation at 12, 35, 45, 49, 70, and 85° East.

Gals satellites are Ku-band only spacecraft originally developed for DBS operations. Two Gals spacecraft currently are collocated at 71° East, where they transmit into eastern Europe via high-powered spot beams within the 11.7 to 12.25 GHz frequency spectrum. Like Express, Gals spacecraft are true geostationary satellites.

Ekran satellites, which operate within the UHF frequency spectrum (700 ~ 780 MHz), are used to provide community TV services to remote locations in central Russia. Operating in the lower end of the Ku-band frequency range, SDRN satellites are used for communications links with the MIR space station.

Service area of transmitting antenna of GORIZONT-41 space station (130E00)



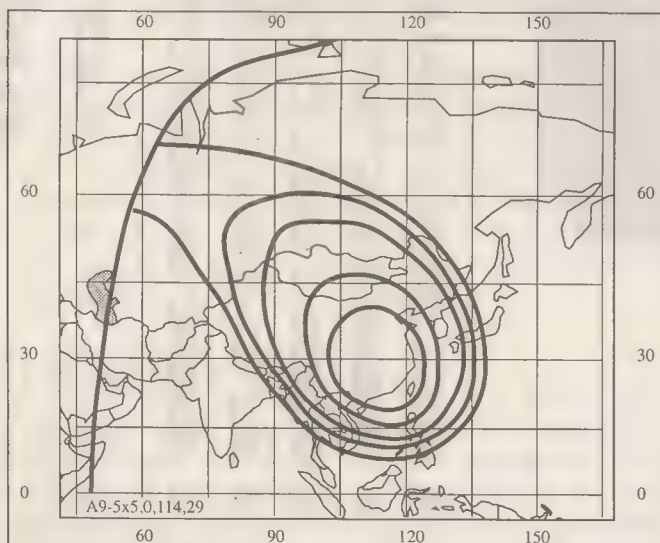
**Above:** TV Laos recently began transmitting its national TV service via the Gorizont-41 spacecraft, transponder 10.

#### **INTERSPUTNIK**

The largest single user of Russian Gorizont satellites is INTERSPUTNIK, an international satellite communication organization founded in 1971. Headquartered in Moscow, INTERSPUTNIK uses about thirty transponders on Gorizont (40, 80, 96 103, 130 and 142.5° E), Express (14° W), Raduga

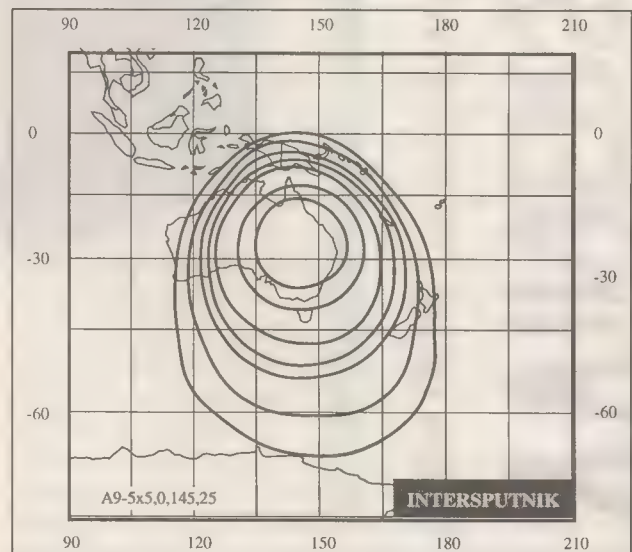
**Below:** The Ku-band transponders on Gorizont-41 and Gorizont-42 offer relatively low power levels.

Service area of transmitting antenna of GORIZONT-41 space station (130E00)



Transponder N 12 (14/11 GHz-/Ku-band) Gmax=30 dB EIRPmax=42.7 dBW  
Contours: -1.0 -2.0 -4.0 -5.0 -6.0 dB

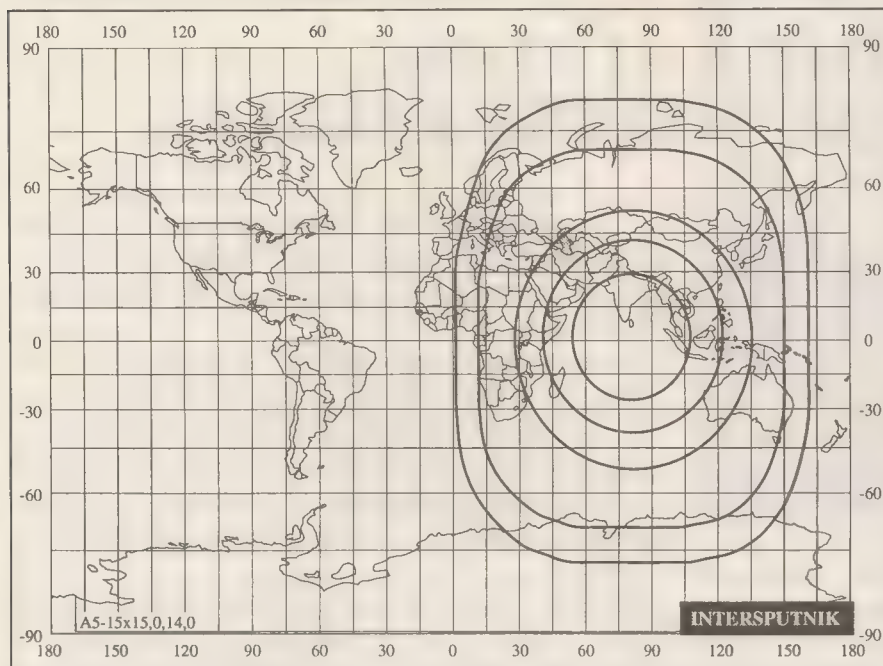
Service area of transmitting antenna of GORIZONT-42 space station (142E50)



Transponder N 12 (14/12 GHz-/Ku-band) Gmax=30 dB EIRPmax=42.7 dBW  
Contours: -1.0 -2.0 -4.0 -5.0 -6.0 -8.0 -10.0 dB



Service area of transmitting antenna of EXPRESS-3 space station (80E00)



Transponder N 7, 8, 9, 10, 15, 17 (6/4-GHz) Gmax=20.7 dB EIRP=31 dBW  
Contours: -1.0 -2.0 -3.0 -4.0 -5.0 dB

**Above:** Global beam on a new Express satellite from 80° East. High-power mode with EIRPmax of 36.7 dBW also available from tpr. 6.

(70 and 85° E) and Gals (71° E) satellites. What's more, additional transponders on many of these satellites remain available for lease by INTERSPUTNIK to member and nonmember organizations alike. While INTERSPUTNIK uses a total of one Gorizont and three Express transponders to transmit voice and other narrow-band traffic, the vast majority of its transponders are used to transmit TV services.

In September of 1995, INTERSPUTNIK announced its agreement to operate two Gorizont spacecraft

(Gorizont-41 at 130° East and Gorizont-42 at 142.5° East) which Rimsat, Ltd. of the United States had previously leased from the Russian Space Agency. A total of ten transponders on these two spacecraft alone are currently used to transmit TV program services to broadcasters and cable TV systems located in India, Laos, Papua New Guinea and elsewhere within the region.

### The INTERSPUTNIK VIII Project

In 1995, INTERSPUTNIK announced the approval of the INTERSPUTNIK VIII project which calls for the manufacture, launch and operation of two new-generation satellites over the Indian and Atlantic Oceans. Preliminary plans call for the two spacecraft to be placed at 75° East and 16° West, respectively. Plans call for the first satellite to be manufactured by November of 1998 with the second satellite to follow by May of 1999.

The INTERSPUTNIK board has approved a 'Space Alliance' with Aerospatiale (France), Daimler-Benz Aerospace (Germany) and SS/Loral (USA) to govern the manufacture and assembly of the INTERSPUTNIK VIII satellites. INTERSPUTNIK has formed a special purpose company (SPC) with outside investors to further the goals of the INTERSPUTNIK VIII project. Any state organization or private company is welcome to become SPC investors.

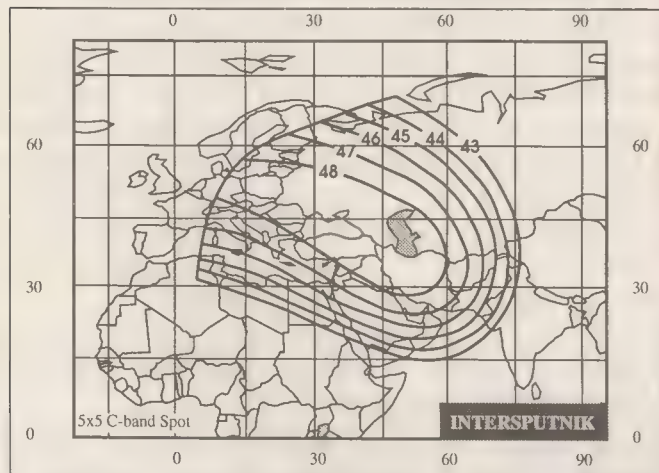
Each INTERSPUTNIK VIII satellite will carry 24 C-band and 16 Ku-band transponders with bandwidths of 36, 54, and 72 MHz. The two new geostationary satellites will have a launch mass of 3,500 kg, generate up to 8,000 watts of power and achieve a mission lifetime of 15 years.

The C-band payload will feature wide shaped transmit beams with a nominal EIRP of 37 to 40 dBW. The Ku-band payload will transmit via steerable spot beams with a nominal EIRP of 48 to 53 dBW. \*\*\*\*

[NOTE on EIRP values: Data for the maps shown herein was obtained from Intersputnik and in some cases is very conservative to the EIRP values presented in Tables 1 & 2 which was obtained from Rimsat, Ltd. of the USA which formerly had contracted to purchase Gorizont and Express satellites from the Russian Space Agency.]

(All footprint maps from WSTV—European Edition ©1996 Mark Long Enterprises, Inc.)

Service area of transmitting antenna of EXPRESS-3 space station (80E00)



**Above:** C-band high-power spot beam from 80° East is for illustrative purposes only and may not be indicative of final beam pointing.



## A RELOOK AT ETHNIC PROGRAMMING SOURCES AVAILABLE

Satellite television delivery systems are now entering what many perceive to be a difficult period of adjustment. The technology to deliver TV programming from any point on earth to any other point on earth surrounds us. Simultaneously, there is a major change in television delivery technology and after 61 years of analogue "electronic TV" the very foundation of the transmission system is undergoing a massive change to digital technology. It is unlikely that any major manufacturer of television receivers will continue to manufacture analogue-only TV sets beyond the year 2002, and equally unlikely analogue plus digital combination format receivers will continue much beyond 2007.

The promise of digital was that it would be universal; a single world-wide television transmission format making possible great economies of production by eliminating the format variations built into analogue (i.e., PAL, NTSC, SECAM and the 10 variations employed by various countries). Alas, someplace between "the promise" and the "actuality" of digital television, someone figured out that while digital could be universal, it could also be a system of virtually unlimited format variations (see SF#23, p. 1).

Control of which viewer tunes in each transmission has long been a corporate dream of the major broadcasters of the world. Analogue scrambling (encoding) was a partial answer because until the decoding pirates short-circuited the scrambling codes to gain "unauthorised access" to the B-MAC (et al) encrypted signals the programmer knew the identity of each viewing location by the unique serial or code number built into each decoder.

For each analogue scrambling technique there must be a permanent IRD (decoder) at each receive location. The IRD is "hard wired" (i.e., built to a specific design) to process only those signals which follow the unique scrambling format of the broadcaster. Even small variations, such as switching from NTSC format video to PAL format video, requires a brand new IRD at each receiving location. The scrambling format is "fixed" and unchangeable with analogue transmission systems.

Not so with (MPEG) digital systems. A digital signal is "unscrambled" only when it:

1) Is transmitted to a specified format or standard (such as the European DVB Compliant standard),

2) Is recognised by the digital receiver as a "standard" format transmission. This means the receiver chosen to receive the transmission must match the digital format of the broadcaster.

Analogue transmission from the beginning of TV-time always followed a specified "standard" and this meant that receiver manufacturers could build receivers to the same standard comfortable they would work when sold to the consumer. Analogue TV began from a no-TV universe; digital TV begins from a well established TV-world.

Within the MPEG-2 "standard" adopted over the period 1993 - 1995 are numerous variants left to the transmission source to define. MPEG-2 is a "soft" standard and rather than defining specific transmission parameters (as with analogue), it establishes "windows" or "ranges" within which MPEG-2 Compliant systems will operate (see p. 22, here).

"Free to air" (FTA) transmission using the digital format has a different meaning than FTA-analogue. Because the analogue system is to a "standard," any variation (such as encryption) that changes the standard will change the FTA "status" of the transmission. Programmers vary the analogue standard for security in an effort to collect revenue for the viewing of the programming. When a analogue transmission is scrambled but a "subscription" is offered to the service, it is called "conditional access"; you may view the programming on the condition that you equip yourself with a suitable receiver and agree to pay the charge asked for accessing the programming.

Lacking a definitive standard for digital and given that even small variations in the transmission data stream can render a receiver unable to receive the transmission, FTA means little. Why? Because if a digital programmer really wishes to limit viewing, they will incorporate conditional access (CA) into their digital data stream. Therefore in MPEG-2 digital transmission systems, there are three levels of reception possible:

1) FTA which occurs only when the transmission standard is matched by a receiver designed to function with the transmission standard;

2) FOCA (free of conditional access) where no attempt is made by the programmer to limit viewing, although the receiver may require new "signal tuning" parameters (software adjustments) to function;

3) CA (conditional access) where the receiver and transmission source must be "in lock" and the receiver's



unique electronic address must be within the data stream transmitted before the receiver will function.

#### And Ethnic Programming?

**Ethnic programming:** A TV programme service in a language you do not consider your own typically depicting a cultural base "foreign" to you.

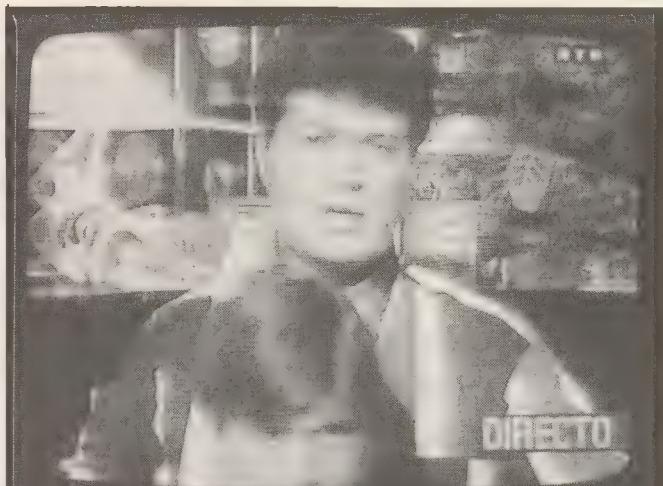
Throughout the Pacific there are enclaves of immigrants; single families to entire towns populated by people from another portion of the planet. How small must a community be before it does not have a "Chinese Restaurant?"

Australia and New Zealand have significant populations from post World War II Europe as well as India, China and the Philippines. In decades gone by these immigrants "stayed in touch" with their families and homelands through regularly scheduled short-wave radio broadcasts and audio cassettes sent through the mails. The advent of low-cost satellite transmission time (i.e., space to broadcast directly from the homeland to the Pacific region) now changes the technology of "staying in touch." The most striking example of satellite growth this year, and probably for the balance of this century, has been and will be the explosive growth in television programming designed to reach émigrés of a homeland no matter where they may not reside on earth.

There are three aspects to this development. In the first scenario, a nation such as Germany develops a custom created television and radio programming service which is totally different from the national TV networks seen within Germany. This is "outreach" television (and/or radio) and it is designed to bring an overview of the homeland to Germans no matter their location.

In the second scenario a nation such as Spain creates an international television service by extracting from one or more national terrestrial networks programming that is initially intended for the terrestrial audience. Such a service typically has a very small "international content" and unlike the German example there is no real attempt to cleanse the international content of the "national warts." Still, the service is specifically intended for international audiences, primarily Spanish expatriates, and the broadcaster (TVE in this example) has designed a world-circling global satellite network quite consciously.

In the third scenario, a national broadcaster (or cablecaster) has selected satellite relay as a means of reaching a multitude of separate terrestrial sites within a single country or region. Recent Gorizont 142.5E user RPN(-9), Manila, is an example. RPN is expanding from a Manila only TV service to a string of new transmitter sites around the Philippines. The least expansive and certainly the most expedient method of feeding RPN network programming to new terrestrial transmitters in Luzon and elsewhere is to send the programming to a satellite. In an ideal world, RPN would utilise a satellite



RTPi, Lisbon based Portuguese international service is FTA analogue on AsiaSat 2

#### ETHNIC SERVICES and AVAILABILITY

**FILIPINO:** Services available - 3 (4th possible by end of year). Satellites - PAS-2 (The Filipino Channel) in NTSC Digicipher 1.5 (early version of MPEG) by subscription only; Gorizont 142.5E (RPN-9) in NTSC FTA analogue; Palapa C2 113E (GMA) in NTSC FTA analogue; AsiaSat 2 100.5E (VIVA movie service) in PAL MPEG-2 variant as part of Star TV service (possibly available by subscription end of 1996). A system capable of receiving all services would require dish mover to track satellite arc from 169E to 100.5E, analogue, Digicipher and VIVA compatible MPEG-2 variant receivers (3 total), switchable linear and left hand circular feed.

**FRENCH:** Services available - 4 (5th promised). Satellites - Intelsat 180E (RFO + RFO-2 promised early 1997), both in SECAM FTA analogue; Palapa C2 113E (CFI + 1 radio) in PAL FTA analogue; AsiaSat 2 100.5E (TV5, MCM + 1 radio) in PAL FTA MPEG-2 DVB Compliant as part of European Bouquet. A system capable of receiving all services would require dish mover to track satellite arc from 100.5E to 180E, analogue and MPEG-2 DVB Compliant receivers (2 total) equipped with switchable linear (As2, C2) and circular (180E) feed.

**GERMAN:** Services available - 1 TV, 3 radio. Satellite: AsiaSat 2 100.5E (Deutsche Welle) in PAL FTA MPEG-2 DVB as part of European Bouquet. A system capable of receiving DW would require line of sight visibility to 100.5E, single LNB and single polarity (linear horizontal feed) with MPEG-2 DVB Compliant receiver. Bonus: Two French, one Spanish, one Italian TV plus 9 additional European/world radio services from same system.

**HINDI:** Services available - 1 TV. Satellite: Gorizont 142.5E (Asian Satellite Net) in PAL FTA analogue. Note: Service is very "spotty" in NZ and Australia and may require dish of 3.7m or larger for satisfactory results. A system capable of receiving this service would only require a dish mover if the dish size was large enough to "see" the inclined orbit of the satellite, analogue receiver, left hand circular feed.

**INDONESIAN (Bahasa):** Services available - 6 TV (Australia), 3 TV (NZ). Satellite: Palapa C2 113E (Anteve, RCTI, SCTV, TV Indosair, TPI, TVRI) in PAL FTA analogue. A system capable of receiving all 6 in Australia would require analogue receiver, fixed dish



-continued from page 13-

with switchable linear polarity feed. In NZ, all 3 services available (TV Indosair, TPI, TVRI) are on same polarity and this eliminates need for switchable polarity.

**ITALIAN:** Services available - 1 TV. Satellite: AsiaSat 2 100.5E (RAI Uno) in PAL FTA MPEG-2 DVB. See German for detail.

**JAPANESE:** Services available: 1 TV. Satellite - PAS-2, 169E (NHK) in NTSC FTA analogue. A system capable of receiving NHK could be simplified to single polarity feed and fixed dish.

**MALAYSIAN (Malay):** Services available - 2. Satellite: Palapa C2 113E (RTM, TV3) in PAL FTA (some encrypted) analogue. A system capable of receiving these services would require an analogue receiver, single polarity feed, no tracking. Note: Both services are scheduled to move from C2 to Measat at an early date and will no longer be visible in most of Australia, none of NZ or western Pacific.

**MANDARIN:** Services available - 8. Satellites: PAS-2 (CTN, CCTV-3, CCTV-4 in PowerVu MPEG; CNBC Mandarin, NBC Asia Mandarin in Philips MUX MPEG-2 variant), C2 (MTV in FTA PAL analogue (not available in NZ)), AsiaSat 2 (Guandong TV, Henan TV in FTA PAL analogue). A system capable of receiving all of these transmissions (less MTV in NZ) would require dish mover capable of tracking from 169E to 100.5E, analogue and PowerVu plus Philips MUX MPEG-2 variant receivers (3 total), linear switchable polarity feed.

**MONGOLIAN (Khalkha Mongol):** Services available - 1. Satellite: AsiaSat 2 100.5E (MTB) in SECAM FTA analogue. A system capable of receiving this service could be a fixed dish, single polarity feed with analogue receiver.

**PORTUGUESE:** Services available - 1 TV, 1 radio. Satellite: AsiaSat 2 100.5E (RTPi) in PAL FTA analogue. A system capable of receiving this service could be a fixed dish, single polarity feed with analogue receiver.

**RUSSIAN:** Services available - 2 TV, 1 radio. Satellites: 145E, 140E, 103.2E, 96.5E with same or variations of Orbita-1 and/or Moscow-1 in SECAM FTA analogue. Note: All Russian satellites require inclined orbit tracking which may be as great as +/- 5 degrees either side of equator. Additionally, audio recovery requires customised de-emphasis circuit or sound-in-synchs for quality reproduction.

**SPANISH:** Services available - 1 TV. Satellite: Asiasat 2 100.5E ((R)TVE) in PAL FTA MPEG-2 DVB. See German for detail.

**TAMIL:** Services available - 1 TV. Satellite: Gorizont 130E (RAJ-TV) in PAL FTA analogue. Reception for this service could consist of fixed dish, analogue receiver, left hand circular feed.

**OTHERS:** LAOS is available in northern Australia from 130E, FTA PAL analogue.

#### Services You Can 'Count On' For The Long Haul

The Filipino Channel, RFO, CFI, MCM, TV5, Deutsche Welle, TPI, TVRI, RAI Uno, CCTV-3, CCTV-4, CNBC Mandarin, NBC Asia Mandarin, MTB, RTPi, Orbita-1, Moscow-1, (R)TVE.

The balance are likely to be interim or change their policy towards viewers in next 24 months.

that only transmitted to the Philippines proper. Today no such satellite exists so in the process of relaying their network programming to 12 new cities in the Philippines RPN also manages to distribute its TV network programming to a wide area stretching from India to the eastern Pacific. If you live within the coverage 'footprint' of the RPN satellite relay, you become an unintended viewer of the service.

#### Legal?

In Australia and New Zealand (as well as virtually all other countries in the Pacific), it is not illegal to own a satellite dish and to tune in free to air programming; whether that be analogue FTA or digital FTA. Programmers such as Radio Television Portugal, Deutsche Welle, RTVE, RAI Uno, TV5, MCM, and CFI direct their efforts to international viewers; the 1996 equivalent of the international short-wave broadcasters of the 50s and 60s. This category of service can be expected to "be there" for the long haul, growing each year. A dish system investment for such a service (or services) would be rated "AAA".

Broadcasters utilising satellite for relay to terrestrial networks are less certain of long-term occupancy of a specific satellite transponder. Deals come and go; RPN Manila, for example, is very likely to migrate to the new 144E Mabuhay satellite when available, a satellite that will come far closer to covering "only the Philippines" than the present 142.5E temporary use of Gorizont. Similarly, other national services such as Malaysia's TV3 and RTM, for many years users of the Palapa satellites, are migrating (moving) to their own country's new Measat satellite. The effect of all of this is a gradual reduction over time in wide area coverage for national services which presently reach unintended viewers. Copyright is at the root of this change. Broadcasters depend upon foreign (i.e., produced outside of their own country) programming to compete within their national markets. Such programming is sold on a country by country (i.e., market by market) basis. When USA produced "The Simpsons" carried by RPN-9 (Manila) wanders outside of the Philippines on the present (temporary) 142.5E Gorizont relay, broadcasters in countries beyond the Philippines complain. They, after all, purchased "exclusive rights" to "The Simpsons" for their market (country) and then, overnight, the same series is suddenly available through DTH, SMATV and cable dishes to viewers in their country from a foreign station. Malaysian TV networks utilising Palapa for relay have dealt with this problem on an interim basis by encrypting those (USA produced) programmes which are licensed to them only for use in their own country. Ultimately, by switching to Measat with a tighter control of the satellite footprint, they can better manage this "overspill" problem.

We are in a steep growth period in the Pacific; very little we have today will be the same in the year 2000.



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not have fully mastered. Upon successful completion of the four major exams, each student will be awarded a certificate of course completion.

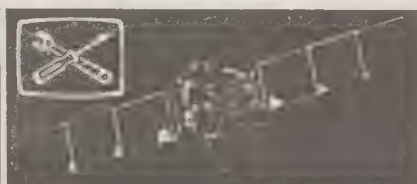
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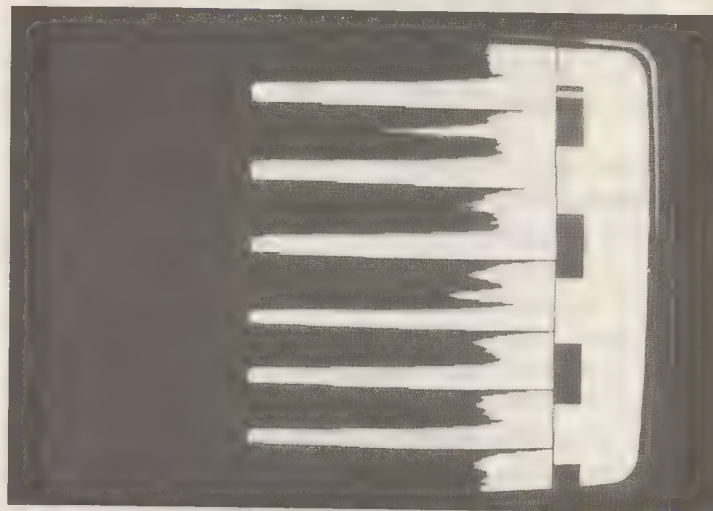
**CORRESPONDENCE COURSE TEXTBOOK (Left):** A comprehensive introduction to all aspects of satellite video and audio technology covering basic satellite terminology and the interpretation of satellite coverage maps; satellite subsystem overview; satellite telecommunication frequency assignments; video transmission and encryption standards, digital video compression and HDTV; international satellite earth station component guide; how to install satellite TV receive only (TVRO) systems, modified polar mount alignment; inclined orbit satellite tracking guide, SMATV system design; the effects of solar outages and rain fades on satellite system design, and a complete lexicon of satellite terminology. The official technician certification course textbook of SPACE Pacific. 212 pages illustrated.





## UNCLE BAYSAT ASKS ...

*Every Body's Talking*  
Is a SPECTRUM ANALYSER



*about the Spectra Explorer!*  
on your wish list???

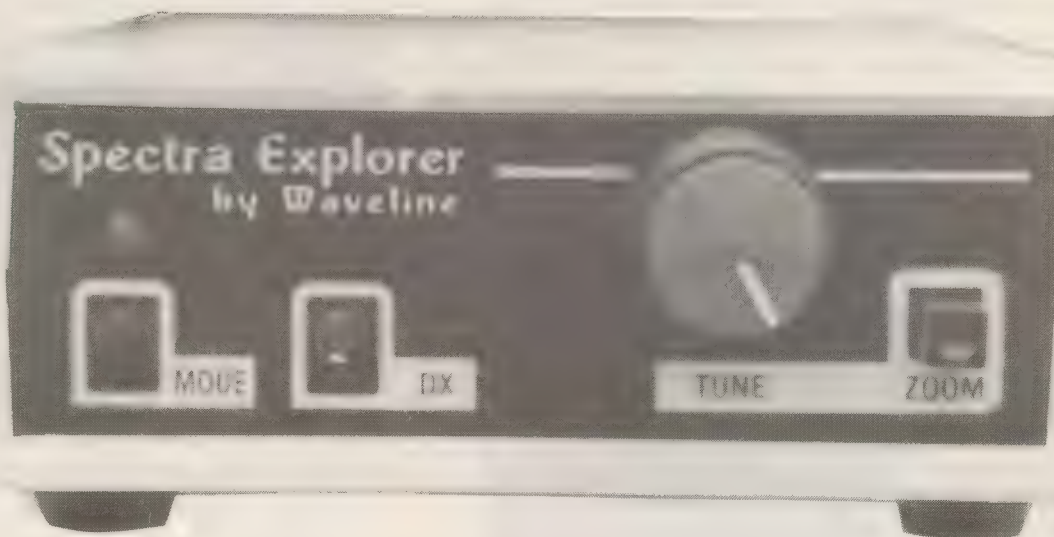
YOU would really like one but just cannot justify NZ\$5,000 plus. On the other hand, without it you face a difficult task with installations, especially those with an orthomode feed (dual LNB) that require cross-pole nulling - something an in-line signal meter will never do! Uncle Baysat has the answer - the SPECTRA EXPLORER SV5ZX from Waveline of Sweden. This unit, when connected to a standard TV set and the IF feed from the dish creates a full display of the IF range 920-2050 MHz. Signal strength is indicated by the length of the white line each transponder creates (see photo above from C2, horizontal).

This unit is so sensitive it will display signals just above the noise floor - below P1 on even the best satellite receiver. Cross pole nulling an orthomode is a breeze with the Spectra Explorer SV5ZX. You have a visual screen reference of declining (or increasing) transponder strength, just as you would on a Spectrum Analyser costing thousands more. The perfect tool for professional installs at a price that will make your bank manager smile!

only  
**NZ\$450**

plus GST and  
freight

- ▶ Right hand vertical stripe indicates band segments (frequency)
- ▶ Mode 1 switches between spectrum display and satellite reception: Mode 2 is spectrum display only.
- ▶ Zoom switch to display only single transponder, rotary dial selects transponder to 'zoom'
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## SL-8000RP

4500 years ago, the Egyptians were so far advanced in building technology that the pyramids were considered to be one of the Seven Wonders of the World. Today, still standing, these magnificent shrines to the achievements of man leave us marvelling at the skill and dedication of these ancient people. Fine craftsmanship is truly an ageless art.

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## From BC2500 to SL-8000RP



Its unique moving Picture-in-Picture feature permits the viewing of two channels at the same time (on one TV or two) or watching one channel whilst recording another. Mix images from satellite and terrestrial TV, satellite TV with VCR playback or satellite TV and security camera output with a choice of picture size for each image source.

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## MPEG-2 DVB UPDATE NUMBER FIVE

### PanaSat IRD520 Update

Following up our review of the South African built Panasat IRD520 in SF#23, this additional experience:

1) Like most MPEG IRDs, too much signal (from the LNB through the downline to the input at the receiver) can be very troublesome. Erratic capture of the intended service, mysterious loss of captured MPEG services may be traceable to overdriving the receiver. Solution: If you have a suitable signal level measurement device, determine whether the receiver input on the desired transponder exceeds 50 dBuV. Lacking a suitable measurement device, knock the level back by adding a power passing 3, then 6, then 10 dB pad capable of working through at least 1.5 GHz. No pad? Insert into the downline a length of RG-6/U (start with 20 metres and double it each time until you find the correct amount of cable loss).

2) Polarisation discrimination. Cross pole signals (from the opposite polarity on As2, PAS-2) drive the IRD520 "crazy." In an orthomode (twin LNB, one each polarisation) installation, the orthomode must be tuned using a spectrum analyser to eliminate the unwanted signal at each (polarisation) port. Mechanical polarisers (a servo motor turning the signal pickup probe) often claim "cross pole isolation" far greater than they can deliver. Feeds that claim linear vertical, horizontal plus RHC and LHC will only deliver adequate cross pole isolation if installed very carefully and then peak cross pole isolation will only occur on a single satellite. You can test with an analogue receiver (spectrum analyser is best) by tuning in the frequency of the MPEG-2 service and adjusting the polarisation "skew" control to see if you detect any sign of signal from the opposite side when you believe you are peaked on the correct side. If there is any signal present, you are in trouble.

(With an analogue receiver try a very strong signal such as CFI on C2 [9901F] and slowly rotate the skew control to locate a point where the strong signal totally disappears. If you cannot make the strong signal go totally away at any setting of the skew control, your isolation is probably not good enough for MPEG-2 reception if there are signals on the opposite polarity from the MPEG service.)

### Japan's Perfect TV! Launch

The table on page 20 illustrates how the new Japanese JCSAT-3 Ku band service is being sold. In the cable and pay-TV business this is termed ala carte packaging;

viewers will have access to a small number of institutional, promotional channels without payment but for all others there will be a per channel charge per month. At press time 108 yen equalled US\$1, as a guide to monthly fees listed.

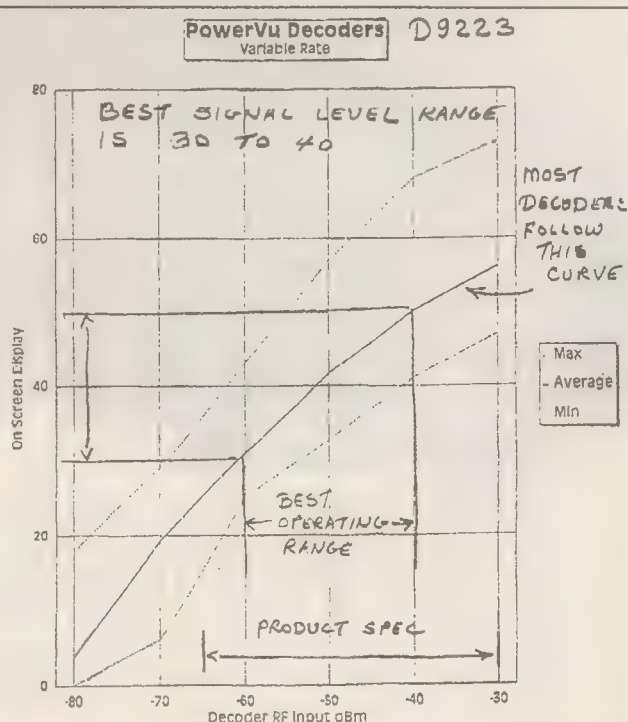
### Scientific Atlanta D9223 PowerVu

The Panasat IRD520 is not the only MPEG IRD to suffer from too much signal. The chart below depicts test results from Scientific-Atlanta Sydney using 12 D9223 receivers. The D9223 within the installers menu tells you the relative input signal level for an MPEG data stream; see numbers 1 - 90 on left hand side of chart. An indicated signal level of 30 on the display screen translates to a real world input of -60 dBm.

The D9223 manual suggests (p. 3-11) an indicated input of 50 - 80 is the correct operating range. On page 4-2, the manual suggests an indicated signal of 30 is "weak."

As the S-A Sydney tests reveal, the actual ideal operating range for the receiver is with an indicated input (see p. 3-19, Commercial Decoder Status table) of 30 to 40. These findings followed a rash of user complaints reporting unstable receiver operation on the Sylmar uplink bouquet (PAS2, 1249Hz).

Solution? Power passing pad, additional coax loss, properly terminated splitters as level reducers. With MPEG, too much signal can be a disaster!



data from 12 samples, July 4, 1996

Chart courtesy Scientific-Atlanta

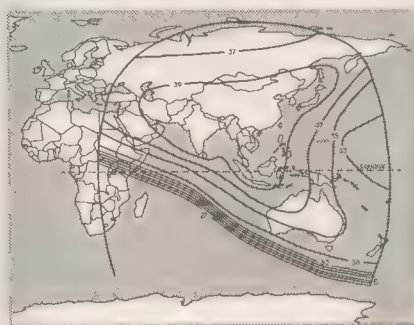


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## HOW PERFECT TV ! IS USING JCSAT-3 Ku BAND RESOURCES

Frequency/Polarity	Programme Name	Description	Start Date	Cost to Viewer
12.508Vt	Perfect Choice	PPV Movies	01/10/96	495 Yen per movie
12.523Hz	Sky A	Sport	01/08/96	700 yen per month
	OKI DOKI	Learn English	20/08/96	600 yen per month
	GLC	Learn English	?	?
	ACCESS!	Traffic Info	20/08/96	300 yen per month
	V'Don	Car information	01/09/96	FTA
12.538Vt	Chikyu no koe	Adult life style	01/08/96	500 yen per month
	Mondo 21	Fashion	01/08/96	500 yen per month
	Channel WE	Entertainment	01/08/96	500 yen per month
	TABI Channel	Travel information	01/08/96	500 yen per month
	Paionia Karaoke	Karaoke	31/07/96	500 yen per month
12.553Hz	Weather Shower	Weather info	20/10/96	500 yen per month
	SPACE Shower TV	Music	20/10/96	600 yen per month
	Life Create Ch.	Information	?	pay per view
12.568Vt	DK Video	Music	31/08/96	500 yen per month
	DK Karaoke	Karaoke	31/08/96	500 yen per month
	Bloomberg	Business news	01/08/96	500 yen per month
	Igi Shogi Channel	Hobby information	01/08/96	400 yen per month
12.598Vt	Gaora	Sport	01/08/96	800 yen per month
	Fighting Samurai	Fighting	31/08/96	1500 yen per month
	DigiCube	Game information	01/09/96	FTA
	NTV	?	?	FTA
12.643Hz	Korean Channel	Korean TV	20/10/96	2000 yen per month
	Better Life	Real Estate	20/10/96	FTA
	Granbell Info	Real Estate	20/10/96	FTA
	Mall of TV	TV Shopping	20/10/96	FTA
12.658Vt	Perfect Today!	TV Listings	30/06/96	FTA
	Perfect Multi	16 screens in 1	01/01/97	FTA
	K Channel	Korean TV	31/08/96	2000 yen per month
	Travel TV	Travel info	31/08/96	300 yen per month
	Kid's Station	Cartoons	01/07/96	300 yen per month
12.673Hz	Satellite Theatre	Movies	20/10/96	1000 yen per month
	Power Movie	Movies	20/10/96	2000 yen per month
	Power Movie Plus 1	Movies	20/10/96	pay per view
	Power Movie Plus 2	Movies	20/10/96	pay per view

### PERFECT TV!

Listings (above) are not complete; additional transponders are on 12.683Vt, 12.703Vt and

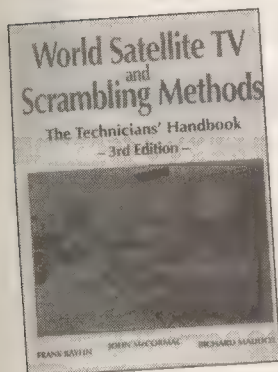
12.718Hz. In that group, BBC World sells for 900 yen (p/m), Chinese TV Network for 600 yen (p/m), Korean KBS at 3,000 yen and a Portuguese channel at 4,000 yen. The entire service is basically "ala' carte" viewer selection of channels or specific programmes.



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## WORLD SATELLITE TV AND SCRAMBLING

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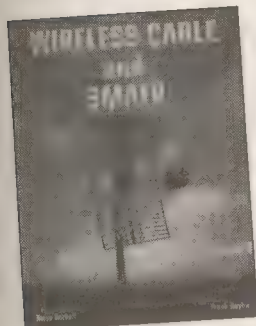


Known as "the technicians' handbook", this text is a must buy for technicians, satellite professionals, and enthusiasts. The design, operation, and repair of satellite antennas, feeds, LNBs and receivers are examined in detail. An in depth study of scrambling methods, and broadcast formats is the backdrop to a discussion of all current American and European satellite TV technologies, including the

Videocypher II, Oak Orion, Filmnet, UK Sky Channel, EuroCypher, D2MAC, BSB and Teleclub Payview III. Circuit and block diagrams of all components are presented and clearly explained throughout the book.....\$79

## WIRELESS CABLE & SMATV

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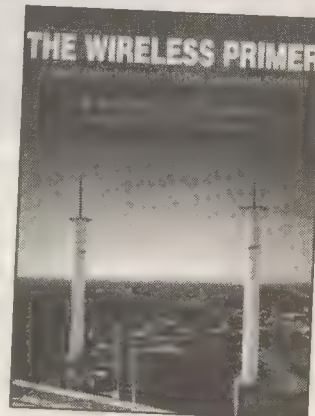


A comprehensive study of the new broadcast method, Wireless Cable, and the closely related field of satellite master antenna TV systems (SMATV). Three chapters are dedicated to details of the site survey, planning and design phases of a private cable system. Off air and satellite headends and all components from antennas to processing and mixing electronics are studied in detail. Ideal for those

considering an MMDS installation. ....\$89

## THE WIRELESS PRIMER

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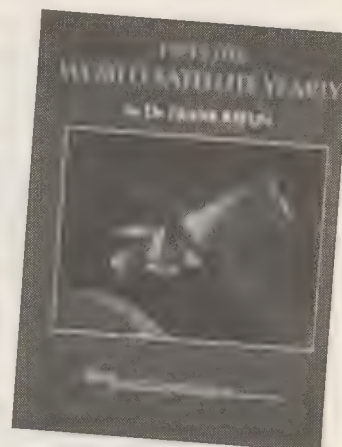


A 76 page complete description of MMDS television systems. This first edition, published in 1995, contains thirteen comprehensive chapters covering all aspects of system design, and shows actual on-air configuration of a 31 channel MMDS system. A valuable reference for anyone involved in installation or maintenance of an MMDS system, "The wireless primer" shows how one operator in the USA saved \$100,000 on hardware by following the designs in this book!! .....\$45

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### Why Is There Not A 'Standard'?

During the last 90 days the awful truth about MPEG-2 has been revealed. Born of noble inspiration and incredible genius digital television was widely touted as "the final standard" for world-wide television. Early backers touted its universal application, claiming MPEG-2 would end "splinter standards" such as exist in analogue TV, allow a single standard for terrestrial TV, cable TV, satellite TV, and state-of-the-art recording systems (whether on tape, hard drives, CD or in the newest recording device, the "flash cube").

MPEG (Motion Picture Experts Group, aka motion picture engineering group) is a sort of trade association of bright people who deal with the technical aspects of making movies. When digital television evolved from a laboratory curiosity to prototype hardware packages suitable for field use in the early 1990s each company working on digital video had its own proprietary approach. The digital "concept" was universal and well reported in engineering publications, trade meetings, technical papers. By 1992 firms such as Scientific-Atlanta, General Instrument, CLI and others were selling complete digital video systems (encoders at the transmission end, decoders at the reception terminus). Each corporate designer created its own "digital video standard" and none of the pioneering firms were interested in "sharing" their special technology with competitors.

The Motion Picture Experts Group, a respected body of engineers with an enviable track record, wisely foresaw the unfortunate result of this "proprietary"

selfish approach to hardware design and as a body largely removed from the influence of any single manufacturer advocated world adoption of a single standard. Manufacturers recognised that if they could "sell" the world on their proprietary design as a "standard" they would never have to 'work' again creating a rush to lobby the MPEG body about the benefits of each proprietary design. In the end MPEG resisted most of these overtures and hammered out a consensus amongst users (as opposed to manufacturers) for "the standard."

This took the better part of three years which brings us to 1995. By this time there were thousands of proprietary MPEG systems in use world-wide which meant hundreds of millions of dollars had been invested in hardware. Naturally those who had bought and put into service these pre-MPEG proprietary digital TV designs were not anxious to have their system investments dismissed by a new standard. Those who purchased this early digital video equipment now became an "economic block" opposed to there being a "standard" that did not fit their equipment.

And then a strange (funny is not appropriate here as nobody is laughing) thing happened. All of the contestants discovered they could be "MPEG-2 Compliant" and still be proprietary. How's that?

MPEG-2 Compliant is a statement of conformity. It means "This piece of equipment complies with the MPEG-2 standard as adopted by the Motion Picture Experts Group." It does not mean "This piece of

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equipment can receive every MPEG-2 formatted digital video transmission." How is that possible?

The MPEG-2 "standard" creates a range of transmission conditions. Let us go back to analogue PAL "standards" for an example:

- 1) 625 lines
- 2) 50 hertz
- 3) 25 frames per second

A transmission with 624 lines operating in a 52 hertz world with 26 frames per second would not qualify for the classic PAL standard.

Digital TV is quantified in (symbol) bit rates, and has a built-in error correction system called the Viterbi rate (FEC on menus). In theory, if you use the receiver menu to enter the appropriate symbol rate (in Megasymbols/second or Ms/s) and the correct FEC rate, as well as the incoming frequency (in Gigahertz or the L-band [IF] numbers as requested), you should have reception.

In practice, these three sets of numbers are but the tip of the iceberg.

The MPEG-2 "standard" dictates a range of acceptable Ms/s and FEC rates if the transmission is to "comply." The transmission source also establishes a number of other parameters under the heading of "system information" (SI).

The "standard" is less exact concerning the way that SI data is configured and there is a range of 'numbers' for each of the SI entries. Most SI information is considered proprietary and unlike the Ms/s and FEC rates which are well publicised, SI information is considered 'private'.

Using the S-A 9223 receiver as an example:

1) Network ID: A number between 0 and 65535.

2) Bouquet ID: A number between 0 and 999.

3) PID (packet identification): A number between 32 and 8095.

4) VBI (vertical blanking interval): A number between 32 and 8095.

5) TID (transport identification): A number between 0 and 65535.

6) Audio PID: A number between 32 and 8095.

7) PMT (programme map table) PID: A number between 32 and 8095.

8) PCR (programme clock reference) PID: A number between 32 and 8095.

The transmission end establishes these numbers and the receiver must respond to the numbers. If the receiver software programme is off by a count or two, everything stops. A programmer who wishes to stay away from "free to air

receivers" has but to vary one of these number sets by a single count and the receivers at the other end will no longer respond. Conversely, a clever person with the required software skills to reprogram a receiver will have to sort through 65535 x 999 x 8063 x 8063 x 65535 x 8063 x 8063 x 8063 number sets to accidentally locate the correct SI to unlock a channel. And that assumes you already know the downlink frequency, Ms/s and FEC!

Standard? Not anytime soon.

Input?

The MPEG plan was to create standards which drew from the "user ranks" rather than from the proprietary inclined manufacturer ranks. The degree of success we are witnessing now indicates this plan did not work very well.



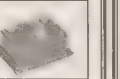

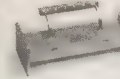






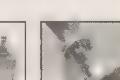
That does not mean we should not at least try to push for more universal application of basic SI (system information) data streams. To that end a survey card appears in this issue of SatFACTS, p. 34, and we solicit your own views using this card. For those who have much to say on the subject, we encourage a broader response in the form of letters or fax replies to 64-9-406-1083. SPACE cannot dictate "standards" nor compliance with standards but it can focus attention on those manufacturers who continue their individualistic habits in the hope public pressure will force a change in their attitude.

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# The CABLE Connection



## Gain/Bandwidth Spectrum: Tiering (Two)

In SF#23 we explored how segments of the cable bandwidth (spectrum) can be utilised for different levels of customer service. In the first step the system designer selects a suitable gain/bandwidth; the frequency spectrum which will be carried from cable system headend to the ends of the cable distribution plant. This decision is simplified by surveying the typical gain/bandwidths available from hardware (amplifier) suppliers.

Thirty years ago a cable TV plant with a gain/bandwidth product of 200 MHz, spanning the spectrum from 50 to 250 MHz, would have been considered quite extraordinary. Twenty years ago the gain/bandwidth product had grown to 280 MHz, covering the range 50 to 330 MHz. Ten years back the state of the design art have expanded this to 50-550 MHz; a gain/bandwidth of 500 MHz. Today 50-750 MHz is on offer and 50-1,000 MHz is the likely next plateau.

Suitable gain, across a defined bandwidth, has grown as the available solid state amplification devices have matured. A cable TV line amplifier requires from 22 to 36 dB of gain over a sizeable bandwidth. As the bandwidth increases and the upper frequency limit is raised higher and higher, the quality of the amplification devices must improve dramatically.

Gain, over a design bandwidth, is only a portion of the challenge. As the bandwidth increases, it follows that more and more TV modulated carriers or data carriers will be carried by the system.

With each expansion of bandwidth comes greater 'loading' of the amplifier devices. A standard AM

(amplitude modulated) analogue TV signal includes the visual carrier, a lower level colour subcarrier and a frequency modulated audio carrier; 3 separate carriers per channel. With a gain/bandwidth of 400 MHz and 7 MHz (PAL-B) channel spacing, there is a potential for 3 times 57(.14) or 171 separate carriers to be individually amplified inside of each amplification device. A cable 'station' amplifier may contain one or several discreet amplification 'devices'.

Any amplification device will self-generate new carriers; a by-product of amplifying. Cable designers seek to keep these new, unwanted carriers at very low signal levels to ensure the amplifier generated products do not create interference to the original carriers sent through the system. Various testing regimens have developed to measure the level of these interfering carriers as a guide to determining the best field operating conditions for amplifier 'stations'. These tests are known as Composite Triple Beat (CTB), Composite Second Order (CSO) and Crossmodulation (CM).

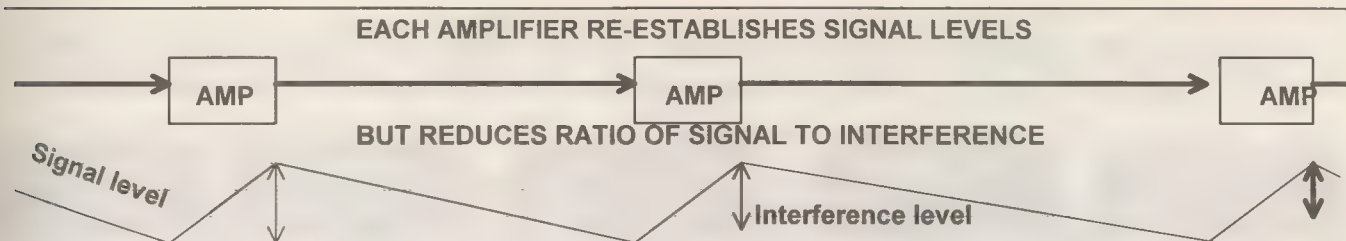
CTB, CSO and CM interference levels increase at each amplifier 'station'; the greater the number of amplifiers in line between the headend and the subscriber tapoff point, the stronger the three forms of undesirable interference become. At some point one or more of these interference categories will increase to the point that the viewer sees "objectionable interference" in his or her TV pictures. The point at which "objectionable interference" occurs is defined as the maximum amplifier cascade possible (practical) for an amplifier of some stated operating characteristics. Not all cable line amplifiers are created equal; some have the ability to operate with as many as 64 amplifiers in cascade (i.e., in a string along a cable main line) while others may only recommend 4 or 8 in a cascade. In each case, the number of permissible amplifiers in cascade is a function of the number of carriers that will be sent through each amplifier. One model, for example, may recommend 8 amplifiers in cascade for 60 'carriers' (20 TV channels) while suggesting only 4 amplifiers in cascade for 120 carriers (40 TV channels).

Amplifiers are always specified for a maximum number of carriers at maximum gain. The very same amplifier may allow 120 carriers at 21 dB of unit gain but suggest only 60 carriers at 24 dB gain; a reduction by 50% the number of carriers when the gain of the amplifier is doubled (3 dB increase).

Still another system design consideration relates to the input level of the individual amplifier stations. A cable line amplifier has gain/bandwidth, and a noise figure. The noise figure in turn determines the minimum input level to the amplifier. The cable system designer strives to maintain the best ratio between his amplified carriers and both interference and system noise. He anticipates that each amplifier will increase the interfering carrier levels to a level greater than the proceeding amplifier and this means the ratio between the desired signal

Gain/Bandwidth	TV carriers - 6 MHz	TV carriers - 7 MHz	TV carriers - 8 MHz
280 MHz	46.67	40	35
400 MHz	66.67	57.14	50
500 MHz	83.3	71.43	62.5
700 MHz	116.67	100	87.5





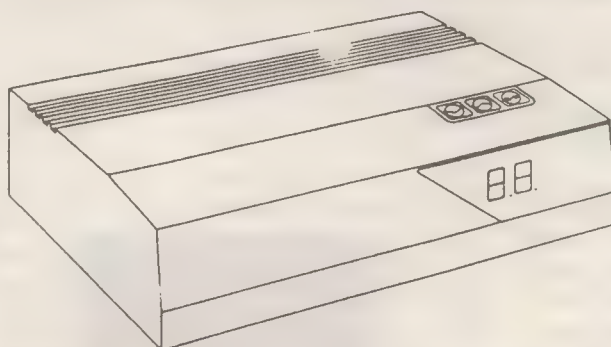
carriers and the undesired interfering carriers will diminish at each amplifier.

The worst point within the system for the desired carrier to interference ratio is at the input to an amplifier station. At this point, as the cable signals enter an amplifier, the signal level has declined through cable and passive attenuation to the lowest system design point while the input of the amplifier presents the highest amplifier noise level. It is critical that the ratio of desired carrier to interference (C/I) and carrier to noise (C/N) is maintained here. One method of improving performance in an amplifier cascade is to (a) back off (reduce) the amplifier output by some amount from maximum rating (3 dB is a typical number; reducing the gain from 22 to 19 dB), and, (b) add 3 dB to the minimum input level required at each amplifier (if the minimum input recommended is +12 dBmV/72 dBuV, raise it to 15/75). The back off creates a more friendly amplifier while raising the input level protects the ingress of system noise into the amplified pictures. There is a substantial price paid for improved system operations, however. All cable plant designs seek to be

'cost effective' which means the amount of equipment installed into the system is held to a practical minimum. When you reduce the available gain of an amplifier station by 3 dB, this has the effect of making the cable distance to the succeeding line amplifier 3 dB shorter. In .500 cable, 3 dB at 550 MHz is approximately 60 metres of cable. If there are ten amplifiers in cascade, and each is placed 3 dB closer to the successive amplifier because the operating gain of the amplifiers is reduced by 3 dB, you will end up 'throwing away'  $10 \times 3$  dB or 30 dB of gain in the cascade; roughly 600 metres of cable at 550 MHz. In effect, you have to use 2 more amplifiers to make up for the generosity of backing each individual amp down by 3 dB at the output. And if you go into each amplifier 3 dB hotter than the minimum recommended, now you have tossed away 6 dB of gain between amps.

All of this has a bearing on the subject of spectrum tiering since the wider the system bandwidth the greater the spectrum planning options as we shall see in coming issues.

**TRIAL  
SAMPLE  
QUANTITIES**



**IN  
STOCK  
FOR  
IMMEDIATE  
SHIPMENT!**

## **47 - 550 MHz CABLE (SMATV) SET-TOP CONVERTERS**

OPEN UP the full 500 MHz spectrum to standard TV receivers: Tune any channel from 47 to 300 MHz (in 7 MHz steps) or any channel from 300 to 550 in 8 MHz steps! PERFECT for motels, hotels requiring additional spectrum tuning capability in lieu of replacing all existing TV receivers.

✓ **IR remote control** - 10m distance ✓ **Favourite Channel Memory** - tune and LOCK only those channels you wish each receiver to access ✓ **PASSWORD** protection on channels locked in memory to avoid user reprogramming ✓ **SAVES** Favourite Channel positions in memory even when power is cut or unit switched off ✓ **LAST CHANNEL** recall to swap between any two channels ✓ **CABLE** system design and proven ("F" connectors in and out). **PRICING:** Under A/NZ\$100 in quantity.

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*The Cable TV Supply Place*

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64-9-406-1083

SatFACTS August 1996 • page 25



# SatFACTS Pacific Ocean Region Orbit Watch: 15 August 1996

Copyright 1996: SatFACTS, PO Box 330, Mangonui, Far North New Zealand (Fax: 64-9-406-1083)

Free-to-Air 57E to 96.5E	
Gemini TV	57E/703 1395RHC
Money TV	57E/703 1348RHC
Sun Movies	57E/703 1348LHC
Sun TV	57E/703 1220RHC
AsiaNet	57E/703 1170RHC
WorldNet	57E/703 1095RHC
NEPC	57E/703 1092/LHC
TVi	57E/703 1015LHC
Azerbaij.	57E/703 980LHC
Discovery India	68.8/Pas4 Vt/1360
Sony Ent.	68.8/Pas4 Vt/1239
Movie Club	68.8/Pas4 Hz/1117
CNN	68.8/Pas4 Vt/1061
TNT+	68.8/Pas4 Vt/1036
BBC World	68.8/Pas4 Vt/995
MTV & Jain TV	68.8/Pas4 Vt/966
TW6 Mos.	80E/1275
TV Viet.	80E/1275
MAPTV	80E/1475
Moscow 1	90E/1475
Moscow 2	90E/1275
India 1	93.5/1025
India 2	93.5/1060
India 3	93.5/1420
CCTV	96.5/1325
Moscow 1	96.5/1475

Free-to-Air 100.5E to 128E	
RTPi	100.5/Vt 1167
TVB Mongolia	100.5Hz 1470
CCTV Henan TV	100.5/Hz 1430
CCTV Guangdong	100.5/Hz 1310
CCTV-4 Beijing	100.5/Hz 1183
Moscow 1	102.7/ 1472
Star TV	113/Vt 970
CFI	113/Hz 990
MTV Asia	113/Hz 1030
TPI	113/Hz 1070
TV Indosair	113/Vt 1090
ABN	113/Hz 1120
ANteve	113/Vt 1130
CNNI	113/Vt 1170
SCTV	113/Hz 1190
GMA	113/Hz 1230
TV3	113/Vt 1250
ATVI	113/Hz 1270
TVRI	113/Hz 1310
RTM	113/Vt 1330
RCTI	113/Hz 1350
CNBC	113/Hz 1530
JCSAT3 (test)	128/Vt 1166 & 12290Hz

Free-to-Air 130E to 180E	
IBC-13	130E/1265
Laos TV	130E/1375
RAJ-TV	130E/1475
Saudi TV	140E/1425
Moscow 1	140E/1475
Udaya	142E/1225
EMTV	142E/1265
EagleNet	142E/1325
RPN-9	142E/1375
ASN	142E/1475
Moscow 1	145E/1475
NHK	169E/Hz 1115
CNN	169E/Hz 1183
Value Channel	169E/Vt 1400
CCTV-4 (MPEG)	169E/Hz 1426
RFO	180E/1105
WorldNet	180E/1179

S14 (Gorizont) 96.5E (RHC) +/- 3.2 deg.	
Jain TV	1,275
Muslim TV	1,425
Orbita II	1,475

S21 (Gorizont) 103.2E (RHC) +/- 1.9 deg.	
APNA	1,375
Orbita II	1,490

Russian Polarisation	
S (Stationar) series satellites are RHC (right hand circular); R series are LHC (left hand circular).	

AsiaSat 2 100.7E	
Sky B-Mac	1130Vt
DW Bouquet (DVB MPEG)	1150Hz 1/DW 2/TV5 3/RTVE 4/MCM 5/RAI
RTPi	1167Vt
CCTV-4	1183Hz
Reuters	1230Hz
STAR Japan (DVB MPEG)	1250Vt 1/"Plus" 2/BBC 3/VIVA 4/CNBC 5/horse racing 6/Sky
CCTV-2	1310Hz
APTV	1351Hz
News-crypt	1390Hz
STAR Asia (MPEG/CA)	1410Vt 1/"Plus" 2/BBC 3/VIVA
CCTV-1	1430Hz
STAR Asia (MPEG/CA)	1450Vt A/D'Star B/D'Star C/D'Star
TVB Mongolia	1470Hz

R41 (Gorizont) 130E (LHC) +/- 0.8 deg.	
IBC-13	1,265
Laos TV	1,375
RAJ-TV	1,475

Palapa C2M 113E	
Star TV	970Vt
CFI	990Hz
Radio TV Brunei	1010Vt
MTV Asia	1030Hz
ESPN (B-Mac)	1050Vt
TPI	1070Hz
TV Indosair	1090Vt
	1100Hz
ABN	1120Hz
ANteve	1130Vt
HBO (B-Mac)	1150Hz
CNNI	1170Vt
SCTV	1190Hz
	1210Vt
GMA	1230Hz
TV3	1250Vt
ATVI	1270Hz
	1290Vt
TVRI	1310Hz
RTM	1330Vt
RCTI	1350Hz
(data)	1370V
TNT+ (B-Mac)	1390Hz
(data)	1410Vt
Discovery (B-Mac)	1430Hz
CNBC	1530Hz
Star MPEG tests	1570Hz
(same)	1650Hz

## NOTES:

C2M replaced C1 at 113E over period 28 June - 1 July. **Bold "OK"** NZ on 3m.

Russian R,S series satellites are inclined orbit;  
+/- indicates extent of present inclination.



S22	S27	I510	I604	I602	I704	Pas4	S13	S30	S6	In2C	S14	As2	S21	C2	Jcsat3	R41	S7	R42	S16	B3	B1	Pas2	I701	I703	I511
40E	53.2	57	60	62.9	66E	68.8	80	85	90	93.5	96.5	100.5	103	113	128	130	140	142.5	145	156	160	169	174	177	180

### OPTUS B3 156E (Ku only)

(B-Mac)	1425/Vt
Central ABC HACBSS	1393/Hz B-Mac
Vic. ETV	1361/Vt CryptV.
Imparja TV	1329/Hz B-Mac
(B-Mac)	1297/Vt
Net 9, Sky specials	1233/Vt B-Mac
Central ABC HACBSS	1201/Hz B-Mac
	1169/Vt
Galaxy	1137/Hz Irdeto Mpeg 2
	1105/Vt
Galaxy	1073/Hz Irdeto Mpeg 2
Golden West	1041/Vt
	1009/Hz
	977/Vt

### S7 (Gorizont) 140E (RHC) +/- 4.3 deg.

Saudi TV	1,425
Orbita I	1,475

### S16 (Gorizont) 145E (RHC) +/- 3.8 deg.

Moscow 2	1,275
Moscow 1	1,475

Optus Ku Listing Credit to Garry Cratt  
of AV-COMM Pty Ltd.

### OPTUS B1 160E (Ku only)

Net 9, Sky feeds	1425/Vt B-Mac
Data	1402/Hz
QSTV	1377/Hz B-Mac
NE ABC HACBSS	1370/Vt B-Mac
NE SBS HACBSS	1344/Vt B-Mac
SE SBS HACBSS	1339/Hz B-Mac
SE ABC HACBSS	1313/Hz B-Mac
Sky Channel	1296/Vt B-Mac
ABC Radio	1276/Hz (digital)
OmniCast	1270/Vt (FM/FM)
ABC feeds	1247/Hz Pal
Net 7	1244/Vt E-Pal
Net 9 feeds	1219/Vt Pal&Ntsc
	1214/Hz
Net 10	1182/Vt E-Pal
Net 9	1180/Hz E-Pal
Net 10 feeds	1155/Vt Pal
Net 7	1120/Vt E-Pal
Net 9 feeds	1091/Vt Pal
CAA air to ground	1009/Vt Nbfm
CAA air to ground	977/Vt Scpc(fm)

### PAS-2 169E (C + Ku)

CCTV3,4	1433.5/Vt (Sa9223)
Abn/Ctn/Cctv/Nbc	1,426/Hz (Sa9222)
Value Ch.	1400/Hz
Discovery (1/2Tr)	1374/Hz B-Mac
MTV Asia	1346/Vt B-Mac
ESPN	1288/Vt B-Mac
MPEG-2 PowerVu Sylmar	1249/Hz (Sa9223)
TNT+ (1/2Tr)	1218/Vt B-Mac
CNN+ (1/2Tr)	1183/Hz
FoxSports	1161/Vt (Sa9222)
NHK	1115/Hz
Filipino Channel	1060/Hz (GI Mpeg)
NBC Mux MPEG	1057Vt (Pace)
MPEG-2 PowerVu HonKong	1002Vt (Sa9223)

### PAS-2 Ku

Pas2 test	12,337
7 feeds	12,420H

### R42 (Gorizont) 142.5E (LHC) +/- 0.8 deg.

Udaya	1,225
EMTV	1,265
EagleNet	1,325
RPN9	1,375
ATN	1,465

### Intelsat 701 174E

Feeds	963
Feeds	984

### Intelsat 703 177E

AFRTS	973 B-Mac *
Feeds	980

\* uniquely left hand circular

### Intelsat 513 177W

Feeds	963
Feeds	984

### (513 Ku)

Service	RF Freq.
US Nets	10980Vt
NBC	11015Vt
Feeds	10510Vt

### Ku Services

Intelsat Ku band services shown here are boresighted to Japan and nearby Asia, have not been reported south of equator. At boresight, signals of <2m levels.

### UPCOMING SATELLITE LAUNCHES

'Anytime Now' / 2nd Russian Express to 80E.  
December/ MPSC (Philippines) to 144E.  
December/ Thaicom 3 to 78.5E.  
January('97)/ 11801 to 174E.

### Intelsat 511 180E(W) +/- 2.4 deg.

TVNZ	964/Ntl 3000
TVNZ	972/Ntl 3000
TVNZ	980/Ntl 3000
TVNZ	988/Ntl 3000
Aust 9	1,021 *
(data)	1,054
Canal +	1,054 **
(data)	1,092
RFO Tahiti	1,105
(vacant)	1,137
World-net	1,179
CBS/e	1,223
Keystone	1,256
NBC/e	1,277
Mpeg tests	1,310
Mpeg tests	1,325
Mpeg	1,388
Keystone	1,432

\* RHC & LHC  
\*\* LHC only  
e/ encryption

### (511 Ku)

Service	RF Freq.
CBS	11480Hz
CNNI	11510Hz



# WITH THE OBSERVERS

## AT PRESS DEADLINE

The latest report on the status of the much-promised DVR-200 Pace FTA digital receiver says that "if" it is shipped to the Pacific and Asia, there will be a mechanical "block" to inserting a CA (conditional access) module built into it; the goal, to prevent it being used for Galaxy reception in Australia.

### DGT-400 Counter Measures

Australian Galaxy Pace brand DGT-400 digital IRDs have been enhanced through an over the air routine conducted typically between 12 midnight and 6AM eastern. DGT-400 units "enhanced" will no longer tune-in the NBC PAS-2 nor the AsiaSat 2 European Bouquet services.

Galaxy claims they did the electronic enhancement because of the addition of an adult ("Night Moves") service which was added early in August. Night Moves replaces the FTA "preview channel" service between 11PM and 4AM AEST.

The enhancement adds a programme rating ("Parental Control") level of user service to the Galaxy package. Prior to the enhancement, Galaxy programming carried no rating classification although the Irdeco conditional access software has always been capable of individually rating each programme transmitted.

The enhancement of subscriber DGT400 IRDs was forewarned with the following announcement appearing within the scroll text of the Preview Channel after mid-July:

**Attention Satellite Channel Subscribers**  
*Your Galaxy decoder operates with software like a personal computer. To ensure the latest software and new features are available for your use, please keep your decoder powered from the wall outlet at all times. Galaxy is currently transmitting new software to all satellite subscribers.*

Those who complied had their DGT-400 units 'hit' with an upgrade that turned the IRD into a programme rating machine. Now, to use the Galaxy service, the user must set programme rating 'limits'. Selecting PG as a rating ceiling, for example, will eliminate any programming rated M or MA. And to make the system work requires keying in a Parental Control pin number (typically 1234 if as originally factory set).

The bad news is that for those using the DGT-400 for C-band reception, once the DGT-400 has been "enhanced" it will no longer access the NBC or European Bouquet services. Why? Because neither service makes use of a programme rating system and once the decoder has been "enhanced" it will only access programming that has been rated.

Can you somehow bypass the censorship classification enhancement? Apparently no, not with any of the user keypad controls or routines. It seems that once your unit has been "hit"

### Satellite Changes - Last 30 Days

APSTAR 1A has been reported testing at 134E. The transponder line-up and footprint coverage should be identical to Apstar 1 at 138E (no coverage south of extreme northern Australia, PNG).

PAS-2 S-A MPEG 1.5 from Sylmar on 1408VT shut down August 7; replacement S-A PowerVu MPEG format from Sylmar has been operational on 1249Hz since mid-May.

PAS-2 CCTV-4 on 1426Hz in S-A MPEG 1.5 uplinked from Hong Kong may shut down 15 August; a replacement half-transponder PowerVu service is testing on 1433.5IF. This service carries standard CCTV-4 plus new CCTV-3 which is theatre and music service. How a D9223 user gains access to this new 2 programme package has not been announced.

PAS-2 PowerVu Hong Kong uplink on 1002Hz, turned off after problems developed early July, is still not back up as of August 8th.

Palapa B2P has been transferred to 144E where Philippines Mabuhay will put it into (inclined orbit) service as a temporary satellite pending launch of their own satellite around 1st of year. Look for test signals from 144E shortly.

Latest location of Gorizont S21, nominally at 103.2E and a cause of interference for AsiaSat 2 at 100.52E, is 102.69; an important .51 degrees closer to As2 than previously.

Russian Express satellite, long delayed to launch to 80E, is now rescheduled for "sometime during August."

by the enhancement message you are prevented from switching to C-band for use there.

To determine if a decoder has been "enhanced," try the following routine:

- 1) Select Decoder Settings from menu.
- 2) Select item 4 (Decoder enhancement).
- 3) Screen will ask, "Are you sure you want to enhance decoder?". The answer should be obvious.
- 4) Screen will say "Checking for enhancement"

**WITH THE OBSERVERS:** Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. Photos of yourself, your equipment or off-air photos taken from your TV screen are welcomed. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for September 15th issue: September 3 by mail (use form appearing page 30), or 5PM NZT September 5th if by fax to 64-9-406-1083.



# MPEG-2 TUNING PARAMETERS (15 August 1996)

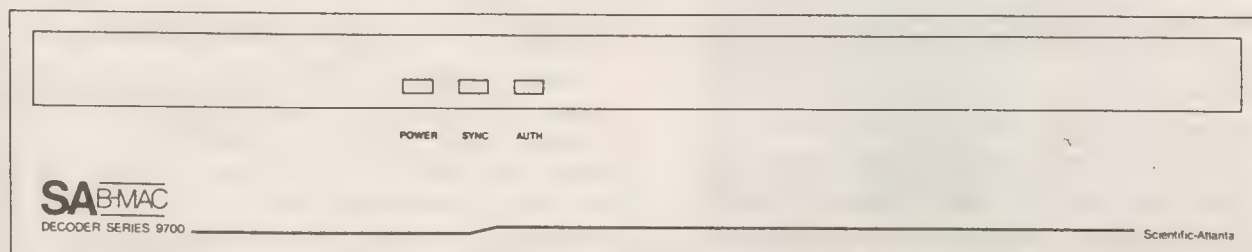
Bird	Service	RF/IF Polarity	# Prgme Channels	FEC	(k)(M)s/s	Interoperable Receivers (1)
As2	EBB	4000/1150 Hz	5TV, 9 radio (a)	3/4	28. 125	NTL, DGT400(2), DVR500, IRD520
	Star +	3900/1250 Vt	7TV, 1 radio (b)	1/2	28. 100	NTL
	APTV (News)	3799/1351 Hz	1TV, 1aux.	3/4	5. 632	NTL, Comstream
PAS-2	TCS Singapore	4183/967 Hz	2TV	1/2	6. 62	S-A PowerVu
	S-A HK MCPC	4148/1002 Vt	6TV (c)	2/3	24. 43	S-A PowerVu
	NBC HK	4093/1057 Hz	7TV (d)	3/4	29. 473	NTL, DGT400(2), DVR500, IRD520
	S-A Cal MCPC	3901/1249 Hz	7TV (e)	3/4	30. 800	S-A PowerVu

1) Interoperable receivers: Receivers which have proven through repeated use to be capable of reliable digital reception for the particular programme service listed. 2) (Pace) DGT400 models will only function for European Bouquet and NBC services if they have NOT been "enhanced"; see page 28 here.

a) (1) Deutsche Welle TV, (2) TV5 (France), (3) RTVE (Spain), (4) MCM (France; not operational 08-8-96), (5) RAI Uno (Italy; not operational 08-8-96), (6) DW Radio 1, (7) DW Radio 2, (8) DW Radio 3, (9) YLE Radio, (10) Swiss Radio, (11) Radio Canada, (12) World Radio, (13) Radio Express, (14) Radio France. b) (1) Star Plus Japan (English)/NTSC, (2) BBC World, (3) VIVA (Filipino) Cinema, (4) CNBC, (5) horse racing feeds, (6) Sky News London, (7) Star Radio, (8) Star Plus Japan (Japanese)/NTSC. c) Note: As of 08-8-96 this feed was still turned off. (1) CTN News, (2) CTN Entertainment, (3) TVBS and other feeds NTSC, (4) CCTV-4 NTSC, (5) NBC Asia, (6) ABN. d) (1) CNBC, (2) CNBC Mandarin, (3) Test, (4) NBC Asia, (5) CNBC Mandarin, (6) NBC Asia Mandarin, (7) test. e) (1) CMT NTSC, (2) CBS feeds, others NTSC, (3) ABC feeds, others NTSC, (4) ESPN2 NTSC, (5) BBC World NTSC, (6) Bloomberg Finan. NTSC.

• B-MAC DECODERS • B-MAC DECODERS • B-MAC DECODERS • B-MAC DECODERS •

## AFRTS + ESPN



**WANTED: Do you have a working B-MAC decoder? YES? Then we would like to hear from you.**  
We are looking for decoders with **MTV, Discovery, TNT, Sky, HBO** or any other service using **B-MAC (PAL or NTSC)**. Call or fax us now!

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SatFACTS August 1996 • page 29





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*New Zealand's only stockist of preused transmit capable antennas - our stock presently consists of the following equipment:*

- 1 only 2° compliant 13 metre standard 'B' Vertex antenna with 4 port circular feed and Cassegrain sub-reflector
- 1 only 3° compliant 10 metre Scientific-Atlanta antenna with 2 port linear feed and Cassegrain sub-reflector
- 1 only 4.6 metre Andrew Ku Band antenna with 2 port feed and Gregorian sub-reflector
- 3 only 5 metre Sat Com Technologies transmit rated Ku band antennas
- 1 only 3.7 metre Comtech transmit antenna with Seavey transmit feed horn

**A selection of receive and transmit electronics including tracking equipment and motor drives with 15 to 50 ton azimuth and elevation jack screws.**

Pacific Antennas Limited is the major stockholder in New Zealand Teleport Holdings Limited, a teleport 90% construction completed. This facility has a standard 'B' 13 metre Vertex antenna with auto tracking capabilities. These companies can individually or collectively joint venture, lease, sell, operate or install all of the above equipment. We have the necessary licensing in place and the hardware has been installed for New Zealand's first privately owned independent standard 'B' uplink teleport. To learn more about business opportunities available, contact **Bryon G.G. Evans.**

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Tel/fax 64-9-424-0841 / Mobile 025-789-160

### **INTELSAT 703 New at 57E ("Hot Bird India")**

**Ku:** Orbit MPEG-2 multiplex (Arabic/English) is on 11.514, 11.638Vt.

**C:** 3755/1395IF RHC: **Gemini TV** (Telugu), audio 6.3, 6.6

3804/1348IF RHC: **Money TV** (Gujarati/English), 6.3, 6.6

3804/1348IF LHC: **Sun Movies** (Tamil), Udaya TV (Kannada), 6.3, 6.6

3930/1220IF RHC: **Sun TV** (Tamil), 6.3 & 6.6

3980/1170IF RHC: **AsiaNet** (Hindi), 6.3, 6.6

4055/1095IF RHC: **WorldNet** (English), 6.65

4055/1092IF LHC: **NEPC** (Hindi/English), 6.6

4135/1015IF LHC: **TVi** (Hindi/English) 6.6

4170/980IF LHC: **Azerbaijan** (Arabic), 6.1

(Courtesy Mark Long, Thailand)

5) If not enhanced, screen will read:

*No enhancement available. Press exit to resume normal operation.*

Several SF readers report their on screen Signal Detection display changed significantly after enhancement with the signal level bar now registering less than 50% of its prior level.

PanAmSat is establishing a major facility in Singapore using the services of the Asia Broadcast Centre to beam PowerVu MPEG service to PAS-4. The Centre is a joint investment of Group W Network Services (owner of Country Music Television) and The Yellow River Network, a Singapore based film producer. Singapore has made major overtures to a number of satellite uplinkers currently utilising Hong Kong, in advance of the handing over of Hong Kong to the Chinese authorities in 1997.

C2M post-mortem. Perhaps the most critical area for C1/C2M has been in eastern PNG and the Solomon Islands. There is no huge audience here but the region is located at a transition point for the various C-band beams on board both C1 and C2. Careful observation of the old B2P coverage, then the interim C1 coverage, and finally the C2M coverage at this "cross-roads" region tells us a great deal about the actual service coverage of C2M. Observer **Jim Ruhe** (Honiara, Solomon Islands) provides the input with a 4 metre Hero dish. On horizontal polarity Ruhe finds P5 signals from MTV Asia (1030), ABN (1120), SCTV (1190), ATVI (1270), RCTI (1330), Discovery (1430) and P4 from TNT (1390). On the vertical side, P5 signals from Radio TV Brunei (1010), TV Indosair (1090), CNNI (1170), TV3 (1250), and RTM (1330). Several transponders are nulled to his location including verticals Star TV, ESPN, ANteve and horizontals CFI, TPI, HBO, GMA and TVRI. "All of these used to be available on (the old) B2P," notes Ruhe which basically says that within the near-fringe of the target coverage area both C1 and C2M have been a step backward for old-time B2P watchers. We refer readers to our detailed report in SF#20, p.6; C2M in the end is less powerful for users in Australia, New Zealand and the (south) Pacific than C1 but both are far better than B2P for these areas. We remind readers that C1 and C2M are the first "shaped (C-band) beam" design birds to be employed and certainly the uneven results observed will benefit future shaped-beam C-band satellite builders.

Also of passing interest; both C1 and C2M were initially taken to the region of 123/124E for checkout prior to making



## S-A SLIPS ONE IN THE BACK DOOR

It appears that at the same time Scientific-Atlanta is denying an intention to build and ship consumer version PowerVu IRDs (previously numbered by S-A as the 9233) Middle Eastern programmer Orbit is offering just such a consumer unit to its subscribers. An SF subscriber in Oman provides a detailed sales data sheet which is partially reproduced here. Note these interesting (never previously announced by S-A) points:

1) Model number 9232 has full function remote control, PAL + NTSC capability, stereo system hook-up, and ...

2) "Full access to any Unencrypted Analogue Satellite Signal".

S-A's data sheet headlines with "The only satellite receiver you'll ever need."

Perhaps. The data sheet fine print is not so encouraging. The receiver appears to have a manufacturer-fixed data rate (49.143 MB/s) and a fixed FEC (7/8); just like the 9222. This may suit the Orbit service but obviously it is of no value for the Pacific services now available (see table, p. 29). Orbit sells it with antenna,

LNB for US\$1,200. For analogue reception the receiver apparently has a single, fixed, IF bandwidth of 27 MHz. Audio bandwidth is not specified. The analogue ("Bypass video") function specifications are not very good; Differential Gain is 8%, Differential Phase is 5% and distortion products are in the 5% region. These are numbers akin to US\$150 analogue units. The D9232 covers 950-1750 MHz with C or Ku band inputs. You can reach Orbit to check it out at +357-909-5000 (Cyprus); they will sell you a receiver! (Prepare to speak Turkish-English and put up with loud Turkish music on hold!).

## SA9232 RECEIVER

BRINGING YOU THE

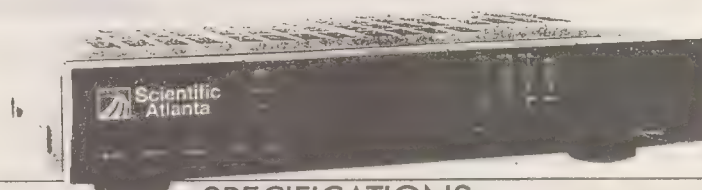


Satellite Television and Radio Network

- KU-BAND AND C-BAND DIGITAL MPEG-II AND ANALOGUE RECEIVER
  - Crystal Clear Digital Picture
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## COOP'S TECHNOLOGY DIGEST

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Published as a confidential industry newsletter ten times per year by electronics and technology author Robert B. Cooper. Reports source checked for accuracy prior to publication; readers are cautioned to conduct their own verification of data prior to formulating business judgements based upon reports here. Data of unverified authenticity may be so-labelled as a guide to reader caution. The publisher draws upon 35 years of leading edge electronic industry media experience but can be misled by those with clever agendas. Entire contents Copyright 1995 by Robert B. Cooper, when 'lifting' material please be courteous enough to credit source ("As reported in Coop's Technology Digest").

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**JANUARY 21 - 25, 1997**

**SOUTH PACIFIC REGION**

**SATELLITE & CABLE SHOW**



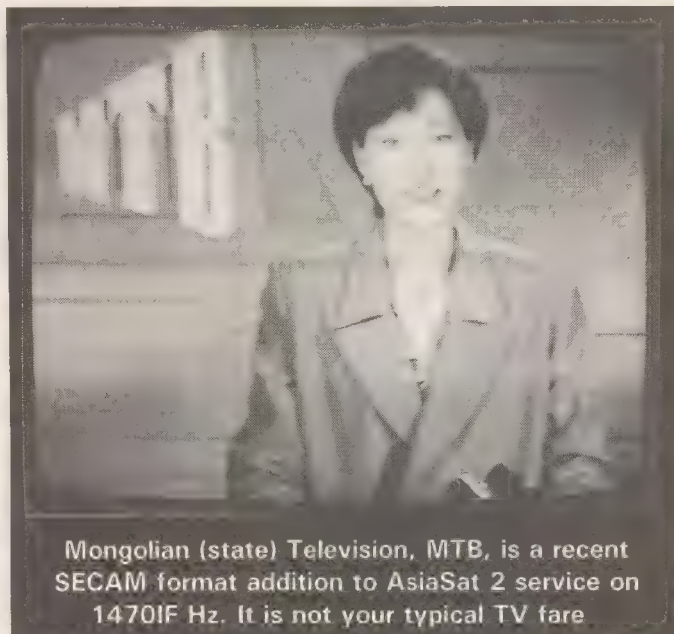
Dates circled on calendar; plans made to attend.



Something you intend to do but have not done yet.



Wife/boss/partner says you cannot attend.



Mongolian (state) Television, MTB, is a recent SECAM format addition to AsiaSat 2 service on 14701F Hz. It is not your typical TV fare

permanent at 113E. This procedure (find a nearby, not in use orbit spot, do satellite testing and then move to the permanent location) turns out to be 'common' practice. Keep that in mind when you begin checking for other new satellites; check in nearby "holes" 5 to 20 degrees away from the assigned orbit location for testing.

Juliet Rebelo is "bitterly disappointed" with the switchover to C2M at her Munster, WA location. When C1 replaced B2P, Juliet was quick to upgrade to a 3.7m antenna which produced watchable signals on a host of C1 services. The C2M switch, however, put her back to where she was before the antenna upgrade. "It's not fair!" notes Juliet. Hang in there Juliet, a number of new satellites will dot your sky by the end of 1997 and that new horizon to horizon mount will get lots of use.

Another disappointed observer is Parmar Ramesh of Suva, Fiji. The primary losers at his location were CNN, ATVI, CNBC, SCTV, MTV and ABN.

Readers looking for the latest Intelsat public data should be aware of a home page Web Site change as of 12 July: "http://www.intelsat.int/". Two South Pacific regional Web Sites include AVCOM (<http://www.avcomm.com.au>) in Sydney and Bay Satellite (<http://www.earthlight.co.nz/baysat>) in NZ.



Observer Luo Shi Gang proudly displays his copy of SatFACTS#22 at the 1996 China CATV Show



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## OBSERVER REPORTING FORM - Due September 3, 1996

- **New programming** sources seen since August 1st: \_\_\_\_\_
- **Changes** (signal level, transponder, programming content) in pre-existing programming sources since August 1st: \_\_\_\_\_
- **Other** (including changes in your receiving system): \_\_\_\_\_

**Note:** Please use P1-5 code when describing reception quality and receiver IF or RF settings.

Your name \_\_\_\_\_  
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**Should even low-priced receivers include BER (bit error rate) diagnostic information?** \_\_\_\_\_

**What should the low-priced units sell for in US\$ at the consumer level during 1997?** \_\_\_\_\_

**Should manufacturers be encouraged to create one single DVB Compliant format?** \_\_\_\_\_

**Additional suggestions** \_\_\_\_\_

Your Name \_\_\_\_\_ Town/City/Country \_\_\_\_\_  
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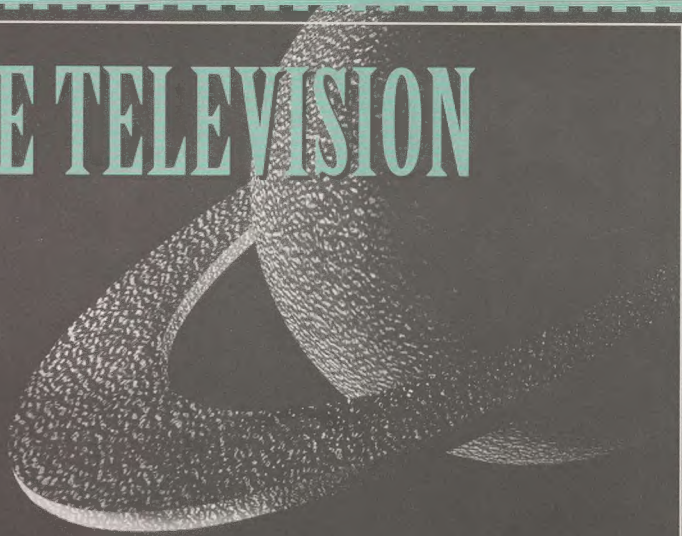
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